

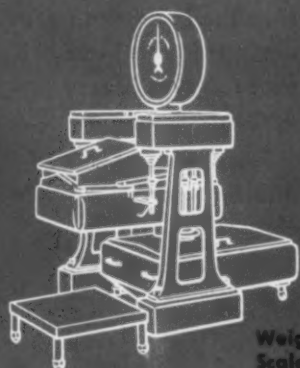
THE IRON AGE

THE NATIONAL METALWORKING WEEKLY

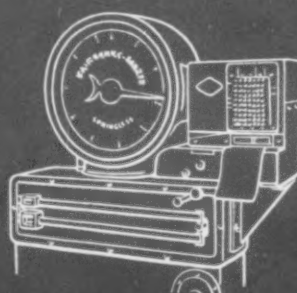
June 1, 1950



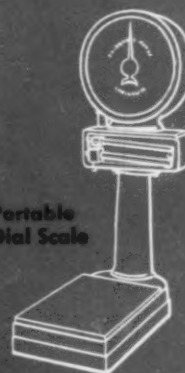
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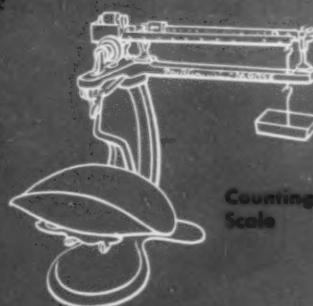
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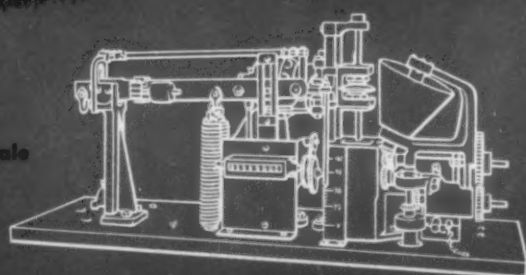
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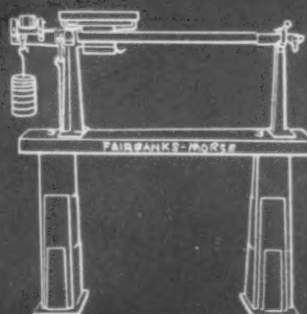
Bench Scale



Counting Scale



Belt Conveyor Scale



Full Capacity Beam

6,154,648 tons of steel rolled on this bearing lubricated by Farval

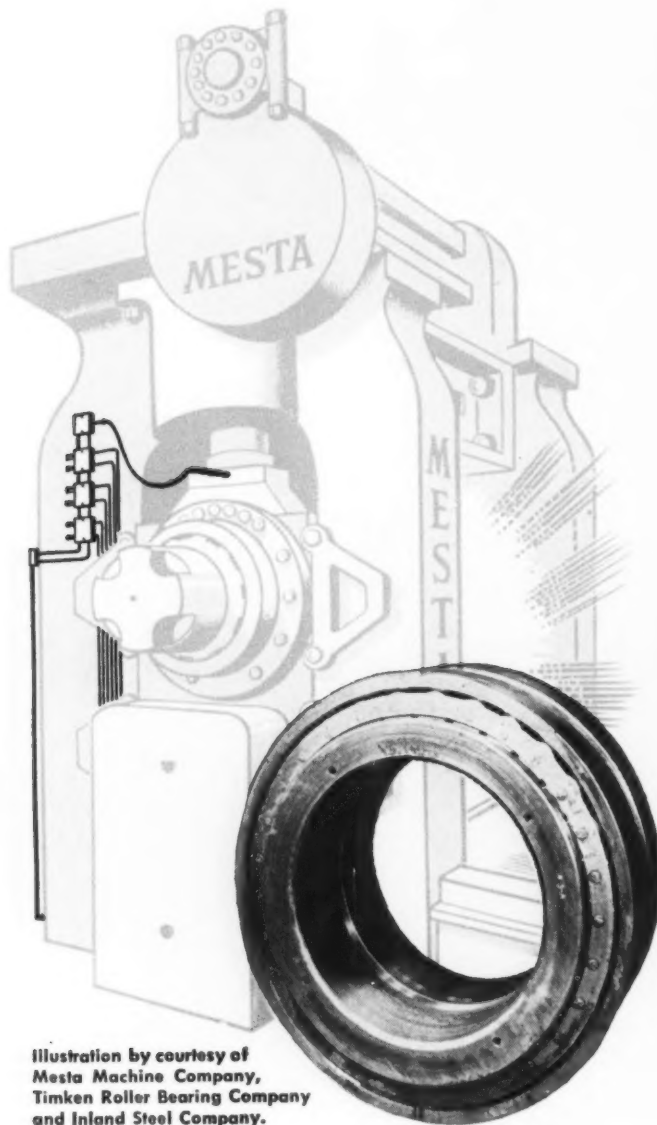


Illustration by courtesy of
Mesta Machine Company,
Timken Roller Bearing Company
and Inland Steel Company.

**FARVAL—Studies in
Centralized Lubrication
No. 116**

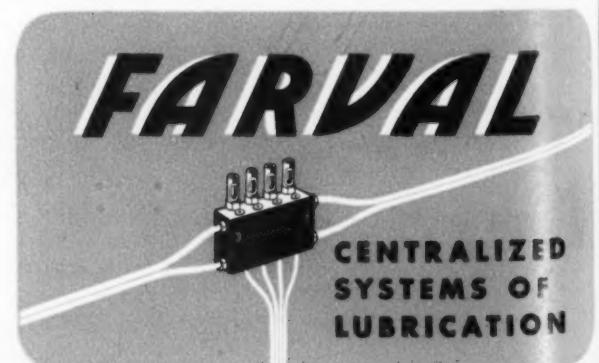
EIGHTEEN years ago, this continuous hot strip mill was installed at the Inland Steel Company, Indiana Harbor Works, East Chicago, Indiana. It was then the last word in rolling mills, with roll necks equipped with Timken bearings and lubricated with three Farval Heavy Duty Automatic Lubrication Systems.

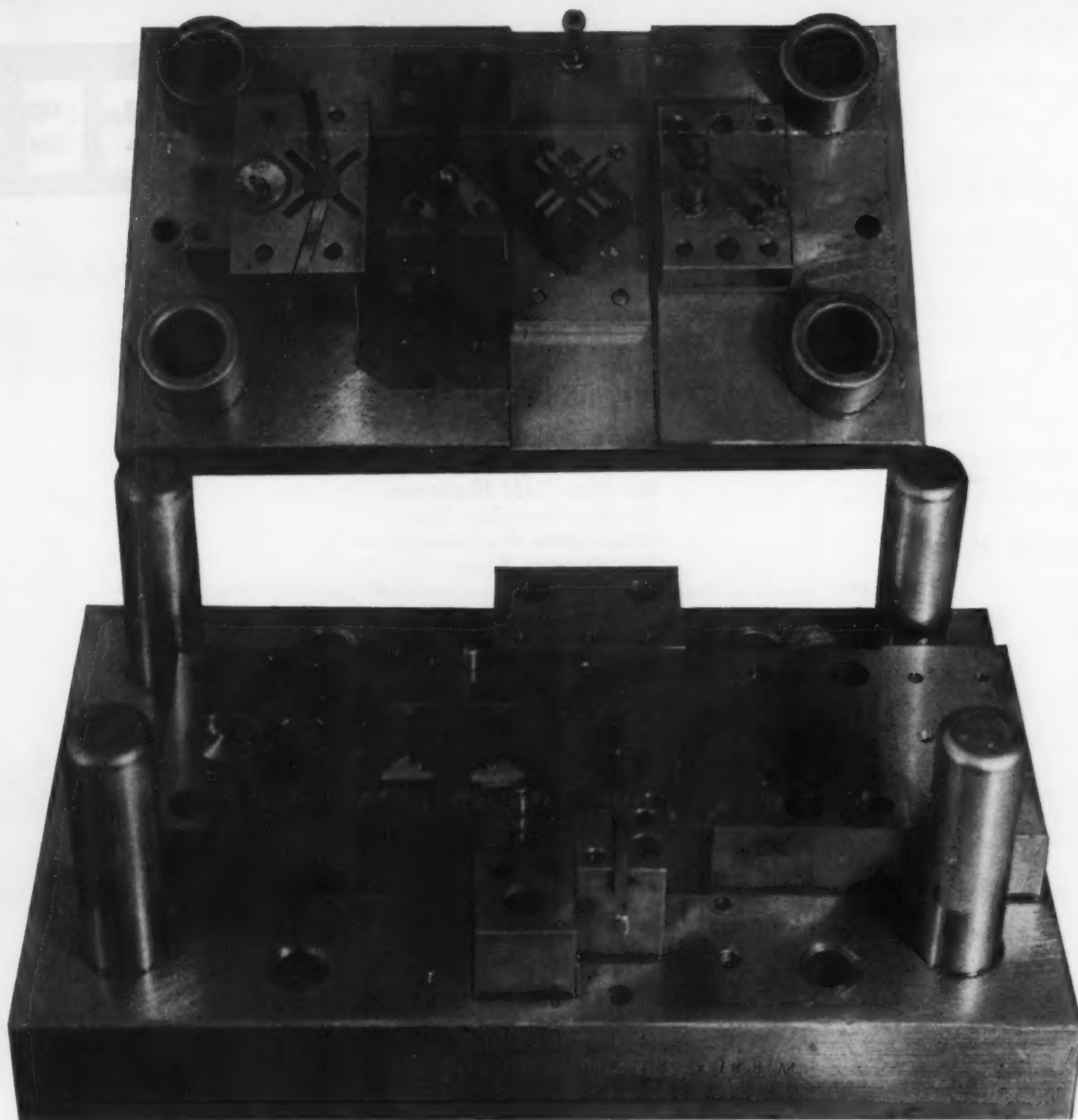
Since then this mill has rolled more than six million tons of steel. The Timken roll-neck bearing shown in this illustration, when removed for photographing, had a total of exactly 6,154,648 tons to its credit. Inspection at that time showed that the bearing was still in splendid condition, good for many thousand tons more. There has never been a bearing failure or an interruption of production because of inadequate lubrication—thanks to Farval.

Farval serves the vast majority of the world's hot strip mills—well over 70% of the mills in America and abroad. And since the original cold strip mill installations in 1930, more than 90% of all the continuous cold mills built have been equipped with Farval.

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Write for Bulletin 25 for full details. The Farval Corporation, 3252 East 80th Street, Cleveland 4, O.
Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.





Photograph courtesy of Day and Night Division, Affiliated Gas Equipment, Inc., Monrovia, Calif.

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This progressive die, which pierces, blanks and forms gas-burner parts from stainless-steel strip, is still going strong after producing several hundred thousand pieces. The punches are made from Lehigh H, Bethlehem's popular high-carbon, high-chrome tool steel, and all other parts from A-H5 (5 pct chrome, air-hardening). Both these

steels are notable for their high resistance to wear and distortion.

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THE IRON AGE

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Special Article



The new Chevrolet Powerglide transmission is machined in nearly 500 operations on standard and special machines. Part I of a two-part article describes the complete machining operations on its bell housing and transmission case.—p. 67.

Issue Highlights



Surface hardening lowers the machinability of thin-section gray iron castings. Silicon carbide cupola addition agents lessen chilling tendency and improve machinability. Tests show tool life increases of from 50 to 100 pct.—p. 73.



Engineering data on hardness of materials at low temperatures is meagre and inconsistent. But standard testing instruments equipped with special auxiliaries enable researchers to gather additional and conclusive material.—p. 77.



With demand for steel pushing the melt to an alltime high, the steel industry is facing what may prove to be one of longest and costliest scrap shortages in its history. Scrap prices are already running wild in several areas.—p. 85.



The unprecedented contract between GM and the UAW has several industries buzzing this week. In exchange for 5 years of industrial peace, GM bartered benefits which the union claims will total 35¢ an hour within the 5-year span.—p. 87.



Nonferrous metals buyers are whistling in the dark in a sellers' market that threatens to overwhelm them. Although a return to pinnacle prices of 1948 is possible, such a prospect cheers neither producers nor smelters.—p. 91.

Coming Next Week



Straight line mass production at Briggs makes possible output of 3000 complex welded and chrome plated stainless steel assemblies per day. Stock is polished prior to forming and assembly. This installation features the world's largest automatic machine for chrome plating stainless.

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Editorial

INDUSTRY VIEWPOINTS

Wanted: Future Top Management

INDUSTRY needs those who can carry on for the future. Men who believe in private initiative. Men who can wage a cold war to keep the things that have made this country what it is. The job will not be easy. It will require jet speed with perfect control. Here are a few of the requirements:

This man of the near future must keep calm when he is called a cheat, a liar, a crook, a fat cat, an enemy of labor, a betrayer of the people and a no-good capitalist. This must not bother him. He has work to do. He must keep the system going, the system that allows anyone to call him these names.

He must be willing to sacrifice time, health, home and sentiments to see that his company makes a profit, that his prices are competitive and that progress is being made.

He must be a good personnel officer. He must know how to hire the best. He must be able to fire the worst without having a strike on his hands.

He must know how to bargain hour after hour when he knows that more wages mean higher prices and more inflation. He must—if he loses the wage battle because of outside pressure—know how to keep price increases to the minimum and cost-cutting to the maximum.

He must see that the stockholder gets his share of the profits—if any. But he must keep enough in the till to pay for machinery which he needs to cut costs and meet competition. Yet he can't keep too much in reserve or the Treasury will tax it away.

He must answer questions as to why he pays the stockholder too much, too little or nothing at all. He must be polite to: the stockholder who wants the meeting in an air-cooled cocktail lounge; the stockholder who wants to know why he is running the company on the rocks; the stockholder who wants to get his Uncle Henry a soft berth.

At home he must be a shining light. He must not bat the kids around. When he reads reams of reports and has phone calls at home he must keep out of the family's hair.

In between decisions he must train someone for his job; see that they train someone for theirs; keep from becoming pompous; listen to insurance salesmen—other salesmen; say good morning and good evening as though he meant it and remember he has a boss too.

When he gets time he can sleep but before he sleeps he must take two or three problems to bed and let them stir around until the alarm goes off. Some job, eh?

Tom C. Campbell

Editor



Manufactured Right

Careful metallurgical control of rolling and tempering assure complete uniformity — your guarantee of strip that will fabricate easily and accurately. Result: less rejects, higher quality.

NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

► One of the major reasons for the current tight supply situation in some ferroalloys is the big jump in stainless steel production. Demand for ferrochromium is hurting output of ferrovanadium, ferro-titanium, etc.

Stainless sales executives themselves can't explain the boom. Except for the obvious new applications, most of the orders are coming from their regular customers.

► Pictures have been taken at one 100-millionth of a second—both in color and in black and white—by a scientist at Aberdeen Proving Ground. The photos, which will be used by Ordnance in shock and detonation research, are made by a camera employing an apparently new principle of mirrors and grids.

The same camera may be able to make pictures at speeds up to one ten-billionth of a second.

► The government's grain storage program is being extended through this year. It requires no law to get steel industry cooperation on the galvanized sheets needed for grain bins. Between this and the boost in railroad car orders there is no chance of any easing of galvanized sheets this year.

The same supply outlook, though for different reasons, applies to terneplate.

► The magnetic fluid clutch recently developed for the Navy is already being considered for a wide range of industrial applica-tions. Its iron powder, which changes the fluid medium into a semi-solid, is the spherical powder popularly used for radio cores.

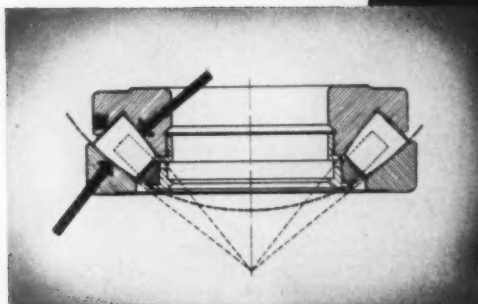
► Home building rolls along at new high levels, tightening the flat rolled steel market like a drumhead. Galvanized sheets, metal lath, bathroom fixtures, molding, baseboard convectors, etc., are all taking their toll of available steel.

► Two oil companies are tooling up to make synthetic benzol, now sold almost exclusively by steel companies as a byproduct of their coke oven operations. The oil company synthetic will sell for about 40¢ per gal, against steel company prices of less than 25¢. Aside from scarcity, the higher price can be had because there is much greater probability of steady deliveries, unaffected by the whims of John L. Lewis.

► The freight car building program may pick up even more steam than it got last month from the 10,000-car PRR order. Reason is that replacement is looking more attractive from the economic view-point. The national defense aspect is not to be overlooked either.

► To meet stiff price competition from glass tubes, some televi-sion tube makers have cut the gage of the stainless steel used for the cone from 0.125 to 0.100 in. The heavier gage is still being made but producers are swinging over to the lighter product. Ex-perimental work is being done on stainless down to 0.050 in.

► There is a third entrant in the ingot mold coating race — the race against a July 1 deadline, by which time U. S. Steel must replace tar coatings with a "non-fuming" coating to comply with steel union demands. Masonex, a byproduct of the manufacture of Masonite, looks promising. Best bet now is that it and Darmold Hydropaste will all be used for some time until more data builds up on each.



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Users Stampede for Steel

Hot Scrap Market Explodes

Premium Prices Back Again **IRON AND STEEL INDUSTRY TRENDS**

The Iron Age

SUMMARY

THIS week a full-blown stampede for steel has turned the market into a frenzy. Consumer pressure for delivery of all major steel items is intense. And in cold-rolled sheets there is a panic that rivals anything in history. The zany days of 1948 are back with a bang.

The factors which pumped hysteria gas into the steel market two years ago are all present today. They are: (1) Conversion deals; (2) premium prices; and (3) a runaway scrap market. The gray market is not a big factor now.

Conversion is booming along under a full head of steam, and prices are still going up. Conversion sheets (cold-rolled) that were selling at \$160 a ton several weeks ago are now being quoted at \$175. Major conversion mills have booked their conversion space to the end of the year. Although big consumers of cold-rolled sheets have tried to buy rolling space for the first quarter of 1951, they have not been able to place much tonnage.

Premium Steel Prices Return

Premium prices, long absent in the steel market, are popping up again. These are prices higher than the regular mill price of most producers, and are usually charged by smaller mills or by marginal or high-cost producers. These premium prices can only be obtained when steel demand exceeds supply. When supplies are adequate no producer would be able to charge premium prices because consumers would simply buy at a lower price from another mill.

Premium prices are now being charged by some mills on hot and cold-rolled strip hot and cold-rolled sheets, plates and carbon forging billets. The premiums range from \$3 a ton on carbon forging billets to \$20 a ton on cold-rolled sheets.

Scrap prices are running wild. The steady advance of recent weeks has now accelerated into crazy flight. No one can say how high this flight will take scrap prices, but all agree that the direction is up. Whopping price increases

in No. 1 heavy melting steel in major scrap consuming areas exploded THE IRON AGE steel scrap composite price to another new high for the year (see p. 118).

Why Scrap Ran Wild

The reason for the runaway scrap market is simple; there is a shortage—especially of good steelmaking scrap. This shortage results from: (1) The record breaking steel melt; (2) low prices last year which caused some scrap sources to dry up; (3) conversion deals that bite off huge chunks of the best scrap and inflate the entire market balloon; (4) earmarked scrap; and (5) some exports.

Steel consumers are being caught between two mighty forces—mounting orders for their products and an increasing steel shortage. Here is some evidence: A major appliance maker is buying 25 pct of its steel from sources other than producing mills. A radio manufacturer scheduled a 20 pct increase in output but couldn't get the electrical sheet to carry it through. A forge and die shop was forced to cut production 10 to 25 pct because it couldn't get enough semi-finished carbon steel. Two farm implement makers have cut back production, saying they couldn't get flat-rolled material. This list can be carried on.

Detroit Feeling Pangs, Too

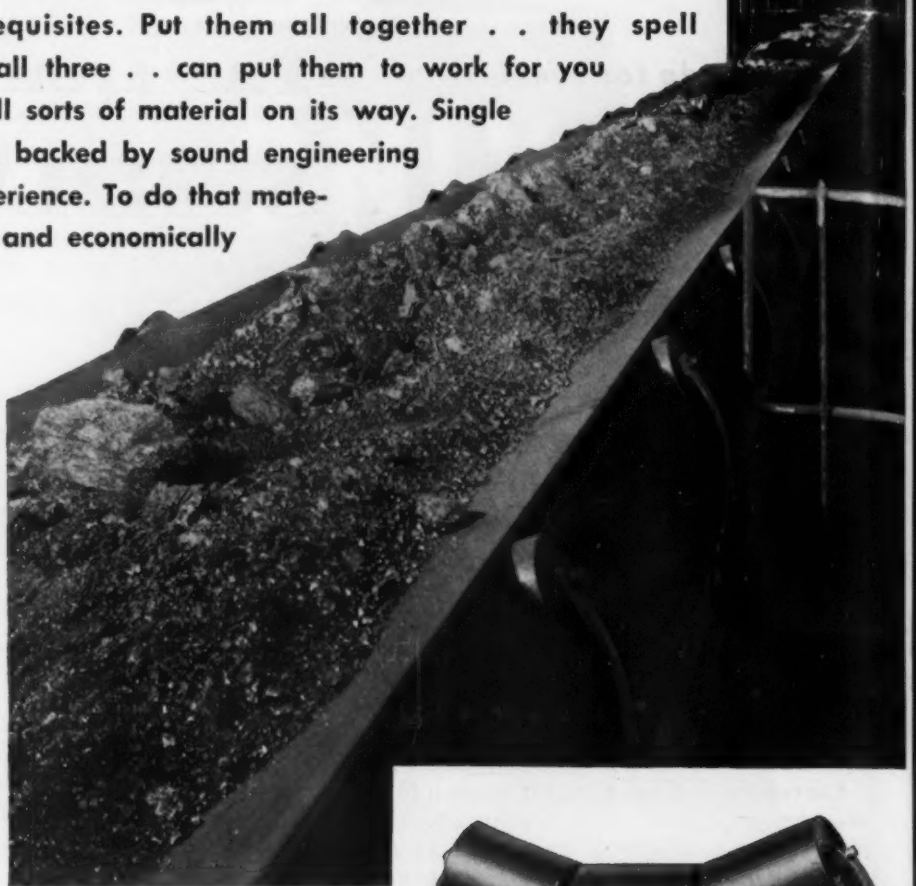
Booming Detroit is also feeling pangs from its hunger for steel. As usual, the bottleneck is the small parts suppliers who feed the auto assembly lines. The Big Three will probably be able to keep their lines rolling by bailing their suppliers out with steel. But the independents are harder pressed; some of them lack the cash to finance purchase of expensive conversion steel—even if they could get it.

Despite the Memorial Day holiday this week steelmaking operations are scheduled at 101.5 pct of rated capacity, the same as last week's record melt.

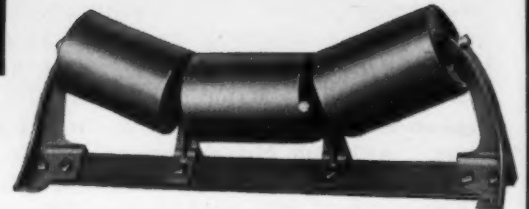
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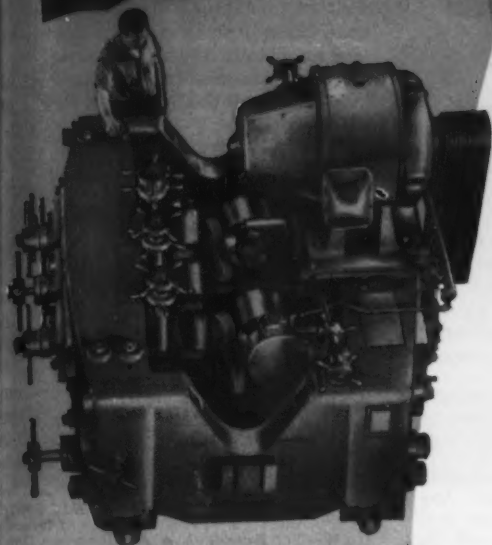
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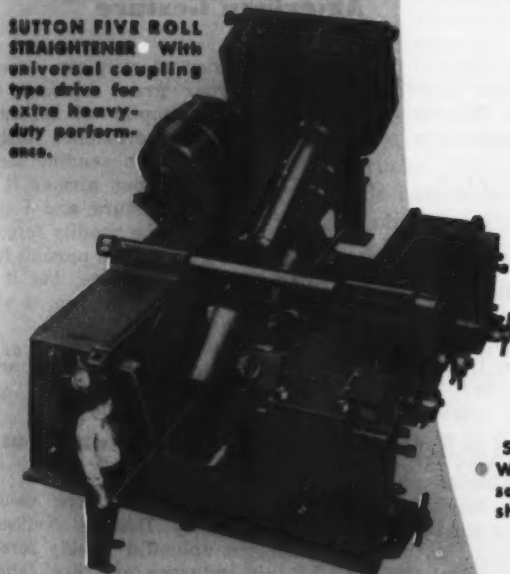
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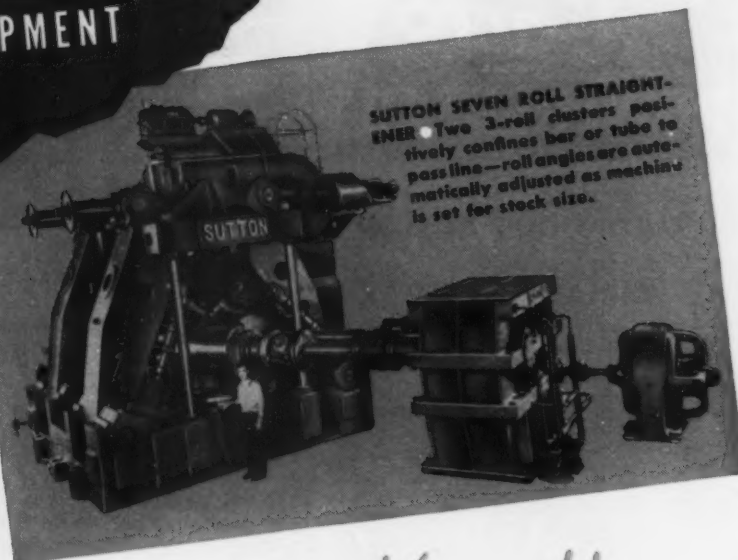
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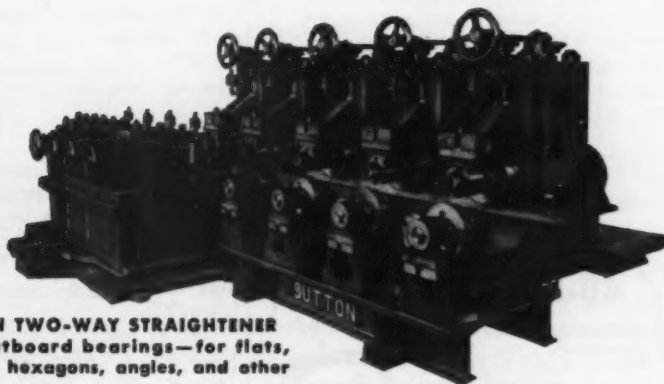
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Sir:

In the issues of Dec. 16, 23 and 30 of 1943 you published a serial article by Dr. Bernard P. Planner. Can you tell me with whom Dr. Planner is connected and where he can be contacted? I am in the process of compiling data enabling me to write up the history of the seamless tubing industry in a nontechnical manner, and would like to contact him.

J. P. BOORE
Manager

Baker Steel & Tube Co.
Los Angeles

Unfortunately, our records do not show the present address of Dr. Planner. Any readers having this information can contact Mr. Boore by addressing him at P. O. Box 7416, Station L, Los Angeles 23, Calif. —Ed.

"Fast Buck" Pros & Cons

Sir:

I think most of Tom Campbell's editorials are good, but I do not think much of the one in the Apr. 13 issue entitled "Who Made the Fast Buck?" My experience over the past four years since the end of the War is entirely different than he explains in this editorial.

S. A. BENNETT
Chairman of the Board
Bennett Industries, Inc.
Chicago

Sir:

I enjoyed very much reading your editorial in the Apr. 13 issue. It was doubly interesting because our president in a speech to the Open Hearth Committee of the AIME on Apr. 11, had expressed somewhat similar thoughts.

It has been our experience that the rank and file steel worker, either as a member of a union or not, doesn't want government controls over the industry as a matter of principle. But too often he has no idea whether or not his industry has actually done a good job. Too often he gets his information about his own industry from distorted newspaper articles or colored facts by radio commentators.

Isn't it about time we really turn on the heat in our own industry to see that the facts are known? If 600,000 people in our industry really knew their industry had done a good job of keeping quality up and prices down, could our headline hunters get away with the irresponsible statements that

these days seem to land on page 1 of most newspapers?

H. W. WRIGHT

Armco Steel Corp.
Middletown, Ohio

Sir:

For whatever it's worth, I have certainly approved of a lot of the things Tom Campbell has done and said—and disapproved of one or two. However, nothing that he has ever written has struck me more forcefully than the editorial of Apr. 13. The entire steel industry should send him a word of thanks for taking up this question and dealing with it so effectively.

E. S. BOWERFIND

Republic Steel Corp.
Cleveland

Our Slip is Showing

Sir:

In your Apr. 27 issue, on the Newsfront Page the statement is made "Despite the higher prices of today's motor cars it took only 954 man-hr to build a 1948 model against 2763 man-hr for a 1941 model." Will you please send us the source of this item, or figures on which the computation was based.

MARJORIE GELBERG
Librarian

UAW-CIO Research & Engineering Dept.
Detroit

This was a typographical error; the item should have read "... it took only 954 man-hr to buy a 1948 model against 2763 man-hr ..." —Ed.

American Gesture

Sir:

I must tender to you my sincere thanks for your great kindness in sending me the copies of Abbott's paper on X-Ray Fluorescence Analysis. Your kindness in sending them free of charge and per airmail is a typical American gesture and I can assure you will not be readily forgotten by me. It may not be possible for me to directly reciprocate, but if I can ever be of service to you, it will be an honour.

S. C. JONES
Consulting Engineer

Staffordshire, England

Clearing House Comment

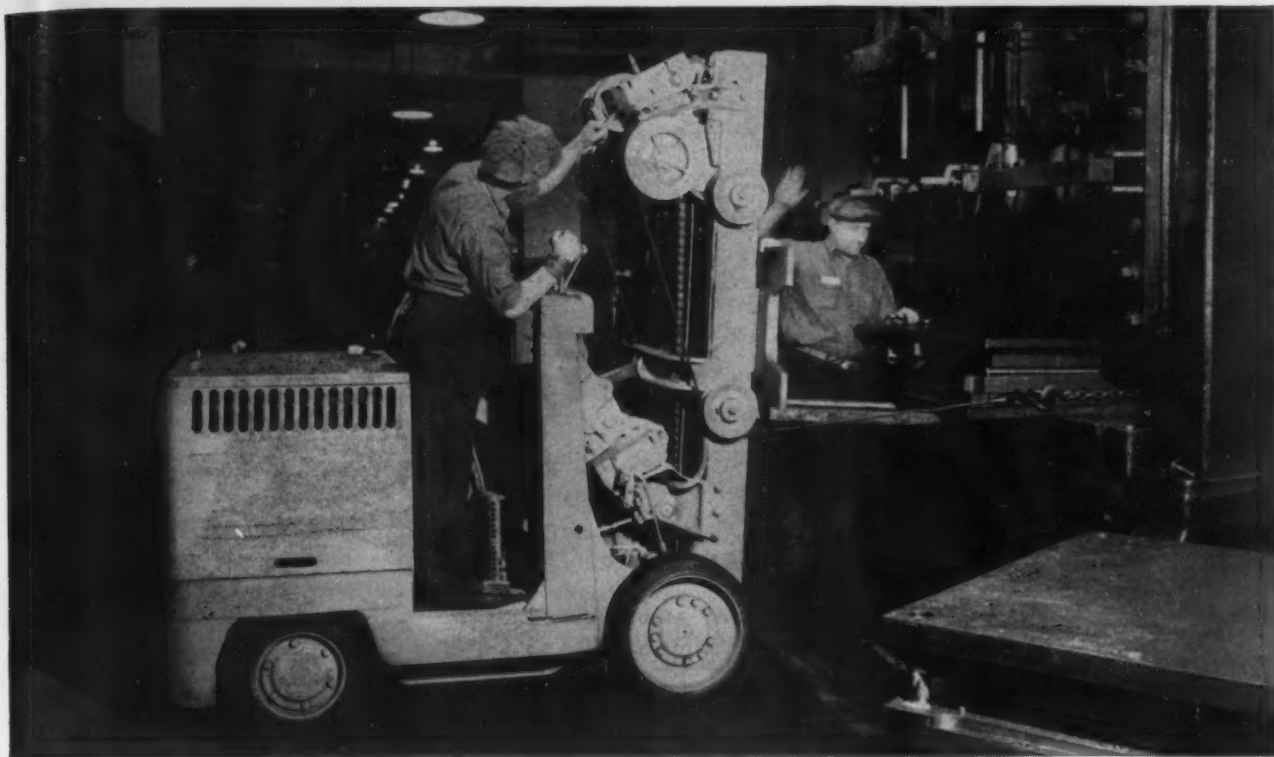
Sir:

I should like to express the thanks of the Machinery Dealers National Assn. for the splendid weekly coverage of our industry and association activities in the Clearing House column of THE IRON AGE.

As you know, we are passing through our critical years (9 and 10) as a trade association. However, with the support such as we are receiving from your publication, and the other great industrial papers, I cannot foresee anything but a tremendous increase in the stature and integrity of the used machinery industry.

R. BRYCE, JR.

Bryce Rankin Machinery Inc.
Detroit



You get Split-second Handling with

Exide-Ironclad battery-POWER

Dependable Exide-Ironclad Battery power is your assurance of finger-tip control, accurate spotting, and steady operation of electric materials-handling trucks. Whether the load is light or heavy, Exide-Ironclads will deliver power instantly to meet all demands typical of *start-stop, lift and shift* manipulations of materials-handling trucks.

Exide-Ironclad Batteries assure full-shift trucking operations (around the clock or calendar) with no unscheduled periods of down-time to

interrupt the flow of materials through your factory or warehousing operations.

The Exide-Ironclad Battery is *DIFFERENT* from all other batteries . . . different in design, construction and performance. The main difference is the Exide-Ironclad positive plate, which accounts for the superior operating characteristics and the exceptional long-life of Exide-Ironclad Batteries in more than a hundred thousand rough, heavy-duty jobs since 1910.

The operating cost of an Exide-Ironclad is low . . . a battery of average size costing less than a nickel per hour to recharge. Maintenance costs seldom exceed fifteen cents per shift. These important factors, together with the exceptional long life of Exide-Ironclad Batteries, provide the lowest cost source of *dependable, full shift* power that can be bought *at any price*.

Write for more facts and **FREE** copy of Exide-Ironclad Topics. It contains latest developments in materials handling . . . shows actual case histories.

THE ELECTRIC STORAGE BATTERY CO.
Philadelphia 32

Exide Batteries of Canada, Limited, Toronto

"Exide-Ironclad" Reg. Trade-mark U. S. Pat. Off.

**DEPENDABLE
POWER**



1888 . . . DEPENDABLE BATTERIES FOR 62 YEARS . . . 1950

June 1, 1950

29

WHAT DOES IT COST YOU
TO MOVE MATERIALS
OVER **200 FEET?**



'Trackless Train'
hauls equivalent
of 8-10 truck
loads.

Mercury "Trackless Train" Speeds **MORE** Tonnage at **LOWER** Cost!

● Hauls every ton for less....travels wherever material movement dictates. Works as a cost reduction team with your fork trucks—relieving them of LONG HAUL transporting—freeing them to handle and stack.

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ported by 'Tug'
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"Banty" gas
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trainload of
sheet steel.



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'Huskie' gas
tractor hauls
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chine part.

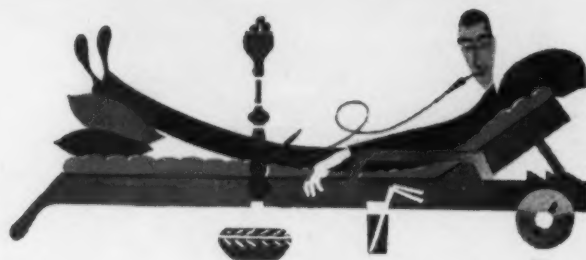
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MERCURY

TRACTORS • TRAILERS • LIFT TRUCKS



Fatigue Cracks

By CHARLES T. POST

Mystery Code

Your favorite family journal's machinery editor, George Elwers, combines the alertness of a seasoned reporter with the acumen for military intelligence of a Navy veteran.

No wonder, then, that when he glanced out the window of Detroit's Hotel Statler the other night he immediately spotted the blinker signal from a window on the eleventh floor of the National Bank of Detroit. "Dash, dash dot, dot dot," it flashed ominously, "TNI, TNI." Elwers watched the signal repeat a few times, then phoned the hotel manager. The manager phoned the police.

A detective with a squad of six headed for the bank building. TNI might mean "tonight at one," a possible tipoff of a sneak air raid on the motor capital, or at least an armed coup on the bank vault. The posse rushed to the eleventh floor, weapons drawn, crashed the door.

The defective fluorescent fixture blinked unabashed.

Jap Invasion

The night of Pearl Harbor the citizens of San Francisco were positive the Jap planes were on their way to the mainland, and the lights-out air raid warning came as no surprise. We were standing in the middle of the street, still ignorant of air raid procedure, when we spotted a blinker signal high in an apartment skyscraper not far from the Japanese consulate.

It took about 10 sec to round up a gang of vigilantes, burst into the apartment lobby, ride the elevator to the floor where we'd seen the light. The eyes of the little man who opened the apartment door popped and he cringed when he saw the menacing throng.

No, he hadn't been sending any signals. All his lights were out,

he swore, except those in a big interior closet with no windows, where he'd retired with his wife. Just then his wife came out of the closet to see what the commotion was about. As the door opened, a broad ray of light crossed the darkened living room, flashed out the window toward the Golden Gate, followed by darkness again as the door closed.

The prominent San Francisco physician promised to shut off the closet light whenever he left the closet for a glass of water or cigarettes, and the vigilantes returned to the street for the air raid that fortunately never came.

Puzzler

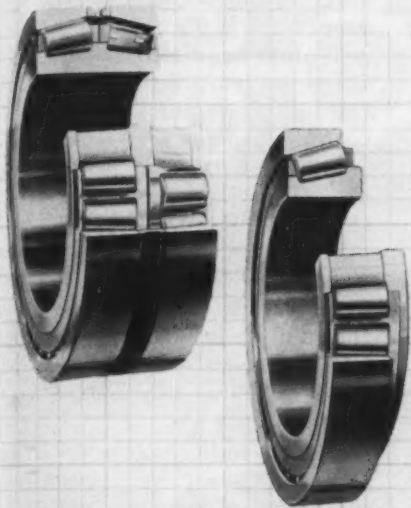
The ten envelopes mentioned last week should contain the following amounts in order to be assured of being able to pay out any requested amount from \$1 to \$1000: \$1, \$2, \$4, \$8, \$16, \$32, \$64, \$128, \$256, \$489.

Joe T. Brashears of W. C. Caye & Co., Atlanta, Howard Fancher of Northville, N. Y., and S. Feigenbaum of Jones & Laughlin Steel, Pittsburgh, are the only readers so far brave enough to calculate the grazing area of the May 18 cow, all coming within a slip of a slide rule of the stated answer.

Both Norman A. Moberg, Duluth, and C. G. Stewart, La Grange, Ill., think it's time to revive this classic: "The combined ages of Mary and Ann equal 44 years. Mary is twice as old as Ann was when Mary was half as old as Ann will be when Ann is three times as old as Mary was when Mary was three times as old as Ann. How old is Ann?"

As Mr. Moberg says, "I know that this problem is twice as old as Ann will be when Mary is three times as old as Ann was when Ann was half as old as Mary, but it may be new to the younger crop of iron and steel men."

TORRINGTON BEARINGS on Mesta reels **help maintain even tension at high speeds**



Mesta Machine Company mounts the shaft of its high-speed tension reel on Torrington Tapered and Straight Roller Bearings to help maintain even tension on strip steel at high rolling speeds.

Torrington Bearings hold the reel drum in proper alignment radially and axially, to prevent wobble or end play that would cause coning or uneven coils. Friction drag and wear is minimized to assure uniform tension and sustained concentricity. Tremendous loads are safely carried by these heavy-duty bearings.

To reduce wear and secure long service life with minimum maintenance, be sure to specify Torrington Bearings for your heavy-duty equipment. Our engineers will be glad to work with you on any friction problem.

THE TORRINGTON COMPANY

South Bend 21, Ind.

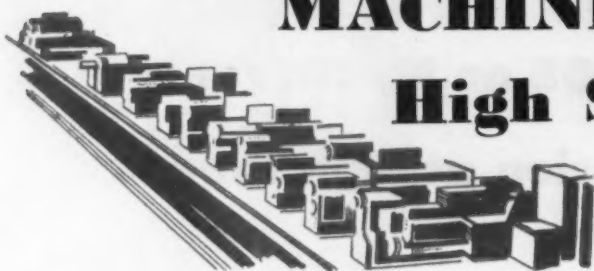
Torrington, Conn.

District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON **TAPERED** **ROLLER** **BEARINGS**

SPHERICAL ROLLER • TAPERED ROLLER • STRAIGHT ROLLER • NEEDLE • BALL • NEEDLE ROLLERS





MACHINE TOOL

High Spots

Sales
Inquiries
and Production



By W. A. LLOYD

Battle for Market—Battle lines were forming quietly this week for what may be the most difficult fight in the spectacular history of the machine tool industry.

The battle will be waged against certain British machine tool builders and an as yet undetermined assortment of European machine tool builders for a share of the U. S. domestic market.

The British are trying to move into this market with machines underselling similar but superior machines produced in this country by as much as 50 pct.

Quality vs. Price—In terms of tradition, performance, service and quality, the United States machine tool industry has the edge. But the British have the price advantage.

With volume participation in foreign markets because of trade restrictions and devaluation in jeopardy, the U. S. machine tool industry must win this fight.

If they lose, it will mean a lowering of standards for the machine tool buyer and producer. Expo-

nents of free trade will probably see this situation as a lovely thing.

Our Own Petard—From the standpoint of national security, it is a crisis. This nation has built up the machine tool industries in friendly countries until they can now challenge seriously the machine tool industry in this country in its own market.

The Marshall Plan has come home to roost.

Rumors Rampant—In Detroit the game of separating credible reports from rumors about new tooling for the auto plants continues.

Brookpark Plant—latest available information on Ford, although unconfirmed, indicates that the six cylinder engine program headed for Cleveland is moving along nicely.

Letters of intent have been going out on the Lincoln engine, but it is now anticipated that changes in this powerplant and the tooling required will not be as extensive as was thought originally.

Mired in Changes—The Chrysler program at the moment appears to be bogged down with engineering changes and re-examination of the 20 per hr production rate that was originally set up.

It now appears that tooling for the six-cylinder engine for DeSoto will largely duplicate present equipment, indicating that it may be 2 years before a new DeSoto engine is in production.

Some sources have anticipated that Studebaker will have most of its new engine tooling on hand by midsummer.

New GM Transmission?—Speculation about a new automatic transmission for General Motors is in the forefront again, but most indications point to the fact that there will be no immediate change here.

Tooling has been purchased for the new Plymouth Road plant, but the best indications are that this will be used for product improvement rather than for a new model.

Uniformity Wanted—In Washington, a Federal Specifications Board has been set up to write specifications for machine tools so that all government departments in purchasing machine tools will refer to the same standard specifications.

The board is composed of representatives from the Veteran's Administration, Departments of Defense, Agriculture, Commerce, Interior, General Services Administration and the District of Columbia.

Board Officers—Chairman of the Federal Specifications Board is Arthur F. Wentzel, Air Materiel Command, Wright-Patterson Air Force Base, Dayton; vice-chairman, W. H. Seaquist, National Bureau of Standards, Washington; secretary, John O. Snyder, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, and technical assistant, Adrian L. Brunett, Federal Supply Service, General Services Administration, Washington.

Sour Note—Members of National Machine Tool Builders Assn. have been advised by Tell Berna, NMTBA general manager, to make certain before the specifications are adopted that they will not bar them from competition for government business.

Machine tool builders were also urged by Mr. Berna to contact the board members writing specifications of interest to their companies, and offer cooperation in reviewing them before they are issued for use of Government procurement officers.

Time Saving Starts Here



● To save TIME, write for Bulletin 147-C.

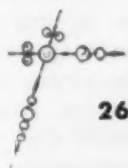
Time saved in your foundry yard can help to maintain your competitive sales position! It can help you make scheduled deliveries on time! Saved time can save your profits!

Today's high cost of time can be countered most effectively with modern, efficient material handling equipment.

During the past fifty years NORTHERN Mag-

net Handling Overhead Electric Traveling Cranes have been installed in many foundries and steel mills because they provide: fast, safe and accurate handling with a minimum of downtime—dependable, continuous service under rugged 24-hour operating conditions—periodic rather than daily lubrication—minimized crane idle time for maintenance. They save TIME!

NORTHERN



ENGINEERING WORKS

2615 ATWATER STREET, DETROIT 7, MICHIGAN.

FREE

USE POST CARD

PUBLICATIONS

Cost Cutting Tips

Why lubrication is important to management, how it affects quality, quantity and cost of goods produced, and what may be done to make lubrication methods a source of cost reductions is explained in the new booklet entitled "11 Ways to Cut Production Costs." The booklet is designed to aid maintenance men in bringing to the attention of management, suggestions for cost reductions through simplified lubrication methods, from barrel-to-bearing. *Alemite Div., Stewart-Warner Corp.*

For free copy check No. 1 on postcard.

Electrolytic Cleaning

"An Introduction to Electrolytic Cleaning" is a useful and informative booklet containing general information on electrolytic cleaning processes. It explains simply the phenomena taking place during both direct and reverse current cleaning and the advantages of each process. Also included is a discussion of properties to consider in selecting a good electrolytic cleaning compound. A few typical cycles are given, along with general recommendations for using Alkon, the versatile new electrolytic cleaner recently announced. *Du Bois Co.*

For free copy check No. 2 on postcard.

Good Places to Work

Following this theme, a new 20-p. booklet presents brief stories about certain representative molding machine installations in leading foundries. Pertinent information about good housekeeping practices in the various foundries, their

New publications that describe money saving equipment and services are available free and without obligation. Copies can be obtained by filling in the attached card and mailing it.

capacity, types of castings, safety measures, melting equipment and other essential data are included. Illustrations of foundry interiors in the catalog show Herman molding machines in action. *Herman Pneumatic Machine Co.*

For free copy check No. 3 on postcard.

For Melting and Refining

The story behind Lectromelt furnaces, along with complete information on their construction, capacities, operation and other useful data, are presented in a new 64-p. catalog. The host of illustrations include photos showing operation of a variety of furnaces, ranging in capacities from 25 lb to 100 tons. This general furnace catalog discusses the more standard sizes in order of decreasing capacity. *Pittsburgh Lectromelt Furnace Corp.*

For free copy check No. 4 on postcard.

Openhearth Ladles

Several sizes and styles of Pollock welded openhearth ladles are shown in a new 4-p. bulletin. The catalog describes how the lighter weight of these ladles in the 60 to 70-ton sizes and over makes possible a 6 pct increase in size of heats. Dimensions and capacities of 411 Pollock ladles in service are listed, showing companies using them. *William B. Pollock Co.*

For free copy check No. 5 on postcard.

Power Generating

Outstanding construction features of E. P. direct-current generators are shown in a new 4-p. bulletin describing this line of equipment tailored to meet the widely-varying demands for direct current, either commercial or industrial. Gas or gasoline engine driven, diesel powered, connected to a steam engine, special mounting arrangements, odd ratings and other details are discussed. *Electric Products Co.*

For free copy check No. 6 on postcard.

Electric Motors

Elliot dc motors, ranging from 250 to 6000 hp, high and low speed for direct, belt or gear drive, are covered in a new 4-p. bulletin. Construction features are illustrated and discussed and a page is devoted to mechanical modifications, such as enclosed models and low-inertia mill type motors. *Elliot Co.*

For free copy check No. 7 on postcard.

Vapor Degreasers

Advantages of degreasing, a description of the process and basic degreaser designs are covered in a new 28-p. manual. Subjects discussed are design, installation, operating instructions, cleaning work, maintenance, solvents, solvent recovery stills and service. The

Turn to Page 104

USE THIS POST CARD

NEW

PRODUCTION IDEAS

New and improved production ideas, equipment, services and methods described here offer production economies. For price and other information, fill in the attached card and mail it.

Ingot Mold Coating

A new ingot mold wash called Mex contains Mexican graphite and a hydrocarbon for gas kick in repelling metal splash. It is said to be safe, easy to use, gives off no fumes, and is not harmful to skin or clothing. Stripping is made easier through the non-wetting, lubricating action of the Mexican graphite. Mex will stay in suspension for hours between heats. Spray test equipment is furnished with large orders. *U. S. Graphite Co.*

For more data check No. 25 on postcard.

Carbide Drill Bushings

Solid carbide drill bushings for drill sizes 0.0280 to 1.7500 in. are made to ASA standards, are interchangeable with standard steel bushings and are said to require no reworking of present jigs and fixtures for substitution. Four types include headless press fit, head press fit, fixed renewable and slip renewable. All are precision ground and lapped for exacting tolerance and finish. *S & E Machine Products, Inc.*

For more data check No. 26 on postcard.

Lock Nut

The new Tufflok nut comprises a one-piece cold forged body of petal design to assure positive insert staking, and a tough hexagon insert that won't turn in its seat and

is specially treated to resist moisture, oil and drying out. Threads cut in the cold forged steel are claimed to be stronger, spin on easier, resist galling, speed up ap-

plication and afford more re-use. The Tufflok nut is available in machine screw sizes No. 4 through $\frac{3}{8}$ in., cadmium or zinc plated, brass and aluminum. *Townsend Co.*

For more data check No. 27 on postcard.

Wet Blaster

To clean and finish metal, the Cro-Hone wet-blaster has been designed for easy maintenance and low cost. All metal parts that come in contact with liquid are stainless

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PERMIT No. 36
(Sec. 34.9 P.L.R.)
New York, N. Y.

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NEW YORK 17, N. Y.

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Price information ☐ on items circled below.

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43	44	45	46	47	48	49	50	51	52	C1	C2	C3	C4

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CITYZONE.....STATE.....

NEW

PRODUCTION IDEAS

Continued

steel or brass, lessening corrosion problems. Siphon jet guns and air agitators eliminate the use of mechanical circulating pumps and other moving parts, cutting down maintenance and repair. Large and heavy work can be handled with ease through two side opening, splash proof work loading doors in the 30x30 in. cabinet. Valves and controls are located at the front of the cabinet. A 28x15-in. window assures excellent visibility and 600 cfm blower removes the abrasive vapors at work table level. The filter is a drawer type. *Cro-Plate Co., Inc.*

For more data check No. 28 on postcard.

Hose Assembly Machine

Hose lines can be made up on short notice and on a production basis with a new hose assembly machine that accommodates all types of standard Aeroquip fit-

tings. It is a heavy duty unit mounted on a cast iron base, equipped with speed selector, tool steel mandrels, and interchangeable jaws. *Aeroquip Corp.*

For more data check No. 29 on postcard.

Chemical Cleaner

Developed for pre-cleaning and post-cleaning of welding and silver brazing operations, Formula 73 can be used as a flux and for preparation of seat fittings on copper and brass tubing. It is claimed to remove rust immediately on contact. It is sponged onto the surface to be cleaned, agitated with steel wool or cloth and then removed along with dirt, impurities, etc., with a clean cloth. Formula 73 has a detergent action. It is non-inflammable and non-toxic, and has been tested by the U. S. Bureau of Standards. *Sully Engineering, Ltd.*

For more data check No. 30 on postcard.

Mild Steel Electrode

A new easy, operating, mild steel E6012 electrode, Fleetweld 72, is introduced for high speed production of single pass fillet and lap welds in the flat or horizontal positions. With higher melt-off rates, greater welding speeds are obtained in depositing dense, high strength, ductile welds. Arc characteristics are said to secure excellent root penetration. The near flat bead eliminates piling up of excess weld metal, gaining greater weld length deposited per electrode. Fourteen and 18-in. lengths are available; diameters, 1/8, 5/32, 3/16, 7/32, 1/4 and 5/16 in.; for operation on ac and dc. *Lincoln Electric Co.*

For more data check No. 31 on postcard.

Wire Crimping Tool

A new air operated tool for crimping solderless terminals to wire is said to combine the advantages of power press with the ease and flexibility of a hand tool. The tool features detachable heads for conventional side position crimping or stub position crimping. A double set of handles and triggers provide versatility of operation. Hardened toggle-action crimping jaws insure uniform pressures and a complete crimping cycle from standard shop outlets of 85 psi. The tool handles wire sizes No. 6 to 1/0. *Aircraft-Marine Products, Inc.*

For more data check No. 32 on postcard.

Expanding Arbor

The Asco Auto-Arb, designed for holding workpieces by the ID while machining the outside surface, is made in a new range of sizes to accommodate work with 33/64 to 1 in. ID on a machine with 1/2 in. collets, and with 1 1/64 to 1 1/2 in. ID with a 1-in. collet. The unit permits chucking and unchucking work without stopping the spindle, requiring no tools for this operation. *Asco Corp.*

For more data check No. 33 on postcard.

Electronic Duplicator

Advantages of an electronically-controlled duplicator attachment for machine tools are simplicity of operation, and ability to provide a smooth control over very slight changes in contour, as well as to make abrupt changes in contour

THE IRON AGE, New York 17, N. Y.

4/1/60

2

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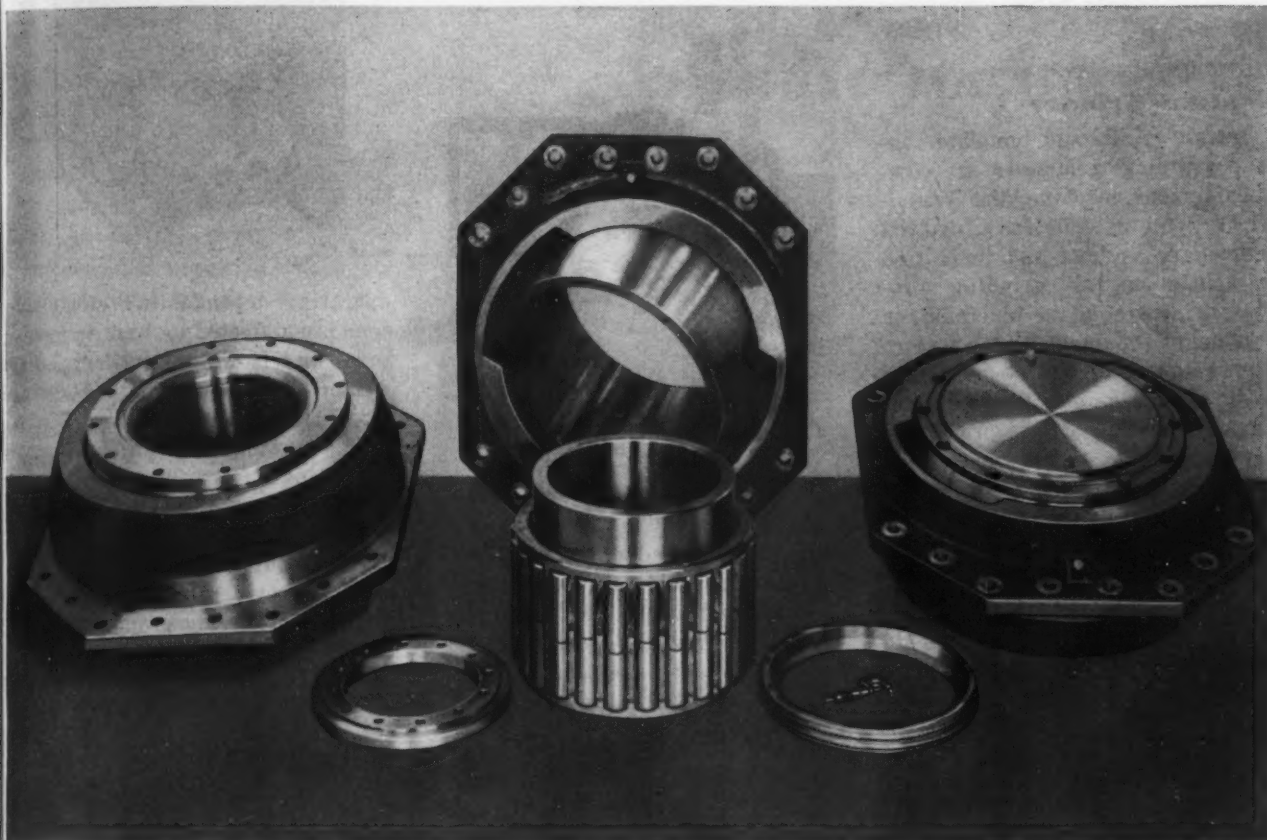
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NEW YORK 17, N. Y.

Big, Busy, Bascule Bridge

at Two Rivers, Wisconsin

designed to pull smoothly on KAYDON bearings



KAYDON RADIAL ROLLER BEARINGS 12.000" x 22.000" x 10.750", with housings

Engineers who designed the new bascule bridge at Two Rivers, Wisconsin, found KAYDON well prepared to meet their demands for four big, husky, compact, radial bearings, with housings, as shown here.

KAYDON specializes in bearings designed for specific duties... and KAYDON has *all* the facilities for producing them. Whatever your bearing problem may be... whether it involves a few specially designed,

heavy-duty bearings 4" to 120" outside diameter, or millions of high precision needle rollers... contact KAYDON of Muskegon for dependable counsel, in confidence.

★ ★ ★

ALSO INVESTIGATE NEW KAYDON TECHNIQUES for hardening raceways only, thus permitting the races themselves to be drilled, tapped, and in some cases, gear cut. Better bearing efficiency in restricted space is assured... surrounding parts can be eliminated... important weight-reduction is accomplished.

THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.

KAYDON Types of Standard or Special Bearings: Spherical Roller • Taper Roller • Ball Radial • Ball Thrust • Roller Radial • Roller Thrust

• ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER •

NEW

PRODUCTION IDEAS

Continued

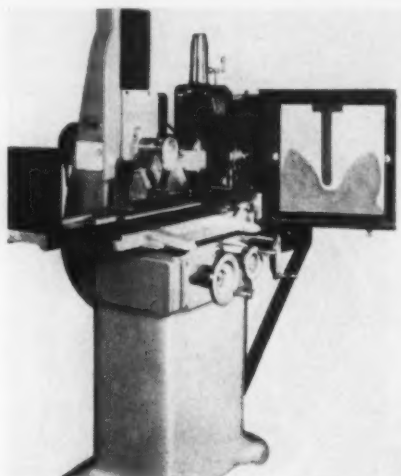
without overshooting. Successful installation are said to have been made on lathes and vertical boring machines for reproduction of cams, turning of molds, complicated contours of rolls, axles and other irregularly shaped parts. *Raytheon Mfg. Co.*

For more data check No. 34 on postcard, p. 37.

Contour Grinder

Image, profile and template contour grinding techniques are combined in one machine, the Visual-Grind contour grinder. Involved setups are avoided and inspection is continuous as grinding progresses; there is no inversion or reversal of the image on the screen. The manufacturer's Bounce-Back feature makes possible Reflecto-Image grinding. Profile projection is performed by placing an auxiliary mirror behind the workpiece, a profile of which then shows as a sharp, dark image on the brightly illuminated screen. The template technique combines Reflecto-Image and profile projection. Visual-grind is said to fill requirements in

form grinding of tungsten carbide, with diamond wheel costs reduced because the form is generated by progressive movements, controlled by magnification. Select matched lenses afford fine definition; adjust-

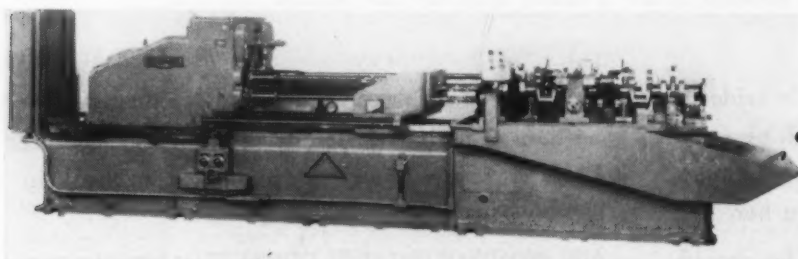


ment is easy and quick. All controls are convenient. Four standard magnifications are available. *Cleveland Grinding Machine Co.*

For more data check No. 35 on postcard, p. 37.

Drilling-Reaming Machine

The horizontal drilling and reaming machine illustrated was developed for drilling and reaming



1 $\frac{5}{8}$ -in. holes in a 60 in. long, 12-cylinder air cooled engine crankshaft. The machine consists of a LeMaire No. 20 hydraulic feed unit having a 60-in. feed with a 6-spindle head, fabricated steel fixture base and two work holding fixtures. A tool support mounted on the ways moves with the head and supports the tools between the

head and the drill guide bushings. After loading and clamping parts, the work cycle is automatic and feeds are controlled by cams

mounted on the cam rail. Two parts are operated on at the same time, one being drilled and one reamed. Three drilling spindles are arranged to feed coolant through oil tube drills and reaming spindles have coolant flooded on the tools. Production is approximately three drilled and reamed pieces per hour. *LeMaire Tool & Mfg. Co.*

For more data check No. 36 on postcard, p. 37.

Portable AC Welder

Silicone insulation on this new portable ac welder is said to provide a high margin of safety and



operating dependability since silicone is unaffected by high temperatures and is water repellent. The welder is compact, measuring 12x17 in. cross section x 23 in. high. It weighs 154 lb; has a current range from 30 to 250 amp; and accommodates electrodes 1/16 to 3/16 in. diam. Instant arc striking without any manual adjustment is provided by hot-start automatic control. The standard Model 6WK20H contains a primary switch and is designed for operation on 220 v. *General Electric Co.*

For more data check No. 37 on postcard, p. 37.

Plate Magnets

Known as Atomagnets, improved non-electric Alnico plate magnets for separation of tramp iron from materials in process come in three models, each with a different magnetic strength: the Extrapower, the Ultrapower, and the Super-



power. The magnet castings are fully encased with a formed cover, increasing longitudinal stiffness and preventing accumulation of

Turn to Page 107

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LUCAS
OF
CLEVELAND

Announces...

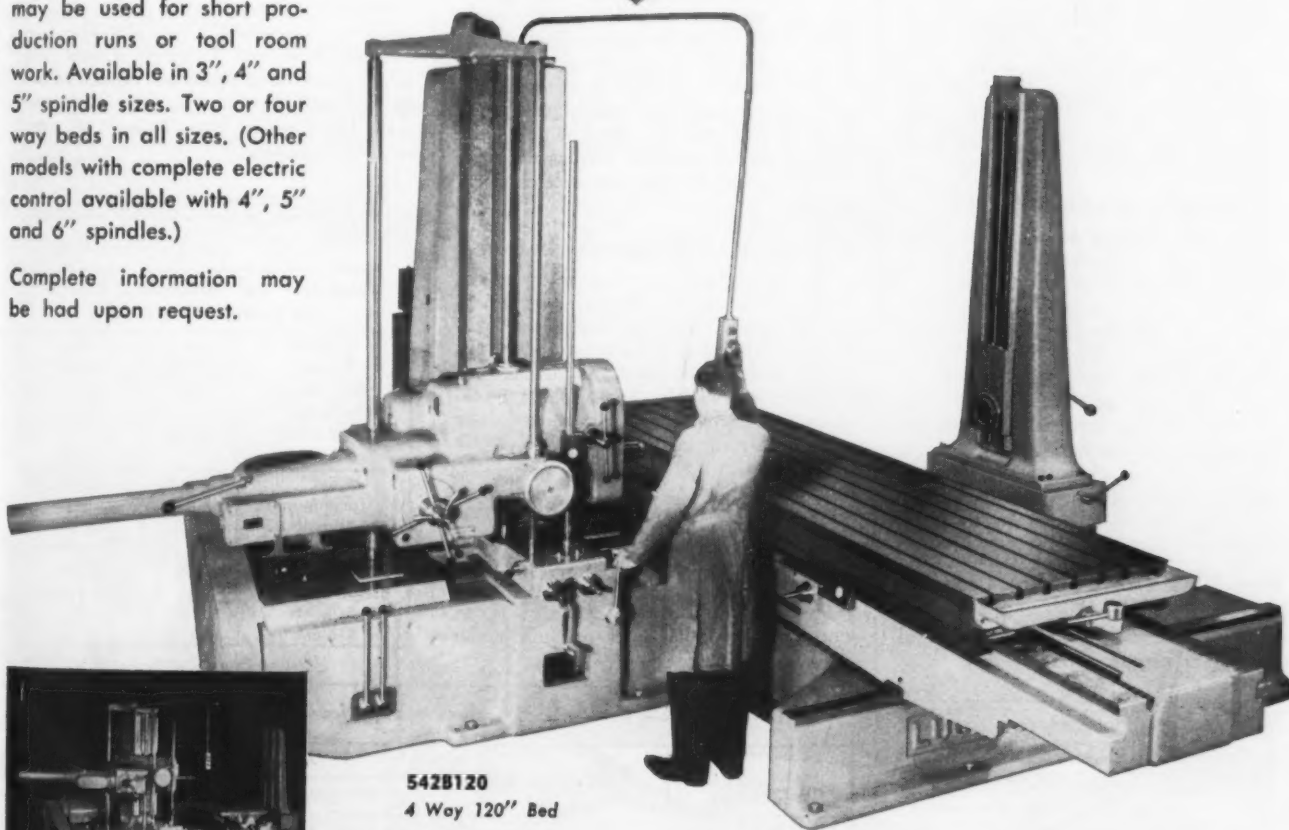
Here is an entirely new series of Horizontal Boring, Drilling and Milling Machines . . . streamlined successors to the rugged, versatile succession of models for which Lucas has been famous 50 years.

Automatic power positioning with simplified, fool-proof controls (available on all models) makes these Series B machines faster on long-run precision production. Standard end measuring rods may be used for short production runs or tool room work. Available in 3", 4" and 5" spindle sizes. Two or four way beds in all sizes. (Other models with complete electric control available with 4", 5" and 6" spindles.)

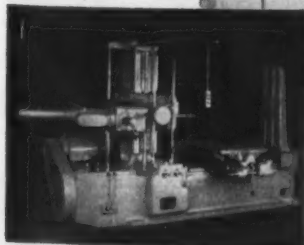
Complete information may be had upon request.

New models

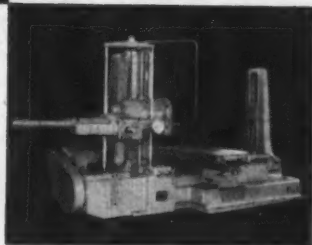
IN 3", 4" and 5" SPINDLE MACHINES



542B120
4 Way 120'' Bed



41B24
2 Way 24'' Bed



42B60
4 Way 60'' Bed

LUCAS Precision

HORIZONTAL BORING, DRILLING AND MILLING MACHINES
LUCAS MACHINE DIVISION, THE NEW BRITAIN MACHINE CO.
CLEVELAND 8, OHIO

FIFTY YEARS LUCAS ONE PRODUCT
CLEVELAND

June 1, 1950

ELECTROMET *Data Sheet*

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Division, Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

How to Control Composition of Cast Iron With Silicon and Manganese Briquets

Control of the composition of cupola-melted cast iron becomes a simple matter through the use of alloy briquets.

These briquets make the old practice of blending two or three pig irons of high and low silicon and manganese contents, to produce a desired composition, both unnecessary and undesirable. A single grade of pig iron can be stocked, and any desired composition in the product can be obtained, simply and economically, by the addition of silicon and manganese briquets.

Function of Silicon in Iron

In cast iron, silicon acts as a deoxidizer and graphitizer. It promotes the formation of flake graphite and softens the iron.

When either the carbon or silicon content of an iron is too low for the section thickness involved, the result will be the formation of chilled spots (iron carbide) at corners and in other rapidly cooled locations. This has an adverse effect on the machinability of the iron and the life of the tools used to machine it. On the other hand, excessively high carbon or silicon content in heavier sections results in open-grained iron that is both soft and weak.

How Silicon Aids Carbon Control

A rather definite relationship exists between the silicon level in a pig iron and its carbon content, as shown in Figure 1.

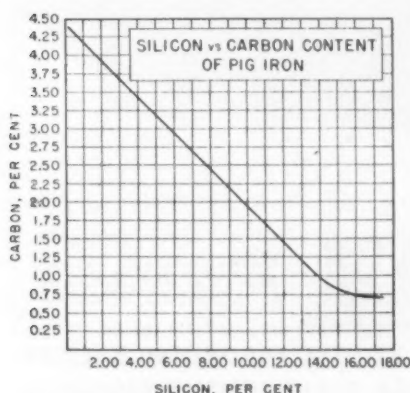


Fig. 1—Relation of silicon and carbon content in pig iron. Notice that the carbon level gradually decreases as the silicon is increased.

As indicated in this chart, an increase in the silicon content of a pig iron has a decided effect in lowering its carbon content. When producing soft iron, where it is desirable to hold the carbon on the high side, pig iron running in the range of 2.0 per cent silicon is desirable in the cupola charge, rather than the higher silicon grades of pig sometimes used in these irons. The additional silicon needed to meet the desired chemical analysis can be easily and economically added to the charge in the form of silicon briquets. This provides an economical and flexible system of chemical control.

Function of Manganese in Iron

Manganese acts as a scavenger to de-oxidize iron. As an alloying element, it imparts density and high strength. It combines with sulphur to form manganese sulphide, which does not have the harmful characteristics of the iron-sulphide inclusions that form when manganese is not present. A manganese-sulphur ratio of 6:1 is suggested.

Briquets Give High Alloy Recovery

Silicon and manganese briquets are available from ELECTROMET in the sizes shown in Table I. These "EM" briquets are all made with a binder that prevents oxidation until the alloy unites with the iron in the

melting zone of the cupola. Thus, the recovery of alloy is high—usually over 90 per cent for silicon and about 85 per cent for manganese.

More Scrap, Less Pig in Charge

Foundries can use an increased amount of scrap in the charge because the analysis of the iron can be adjusted by adding "EM" briquets. This reduces material costs and makes possible substantial savings in cupola operation.

Booklet Available

Further information is given in our booklet, "Briquetted Alloys For The Iron Foundry Industry." To obtain a copy, free of charge, write or phone our nearest office: in Birmingham, Chicago, Cleveland, Detroit, Los Angeles, New York, Pittsburgh, or San Francisco.

The terms "EM" and "Electromet" are registered trade-marks of Union Carbide and Carbon Corporation.

Table I. "EM" Briquetted Alloys for Cupola Additions

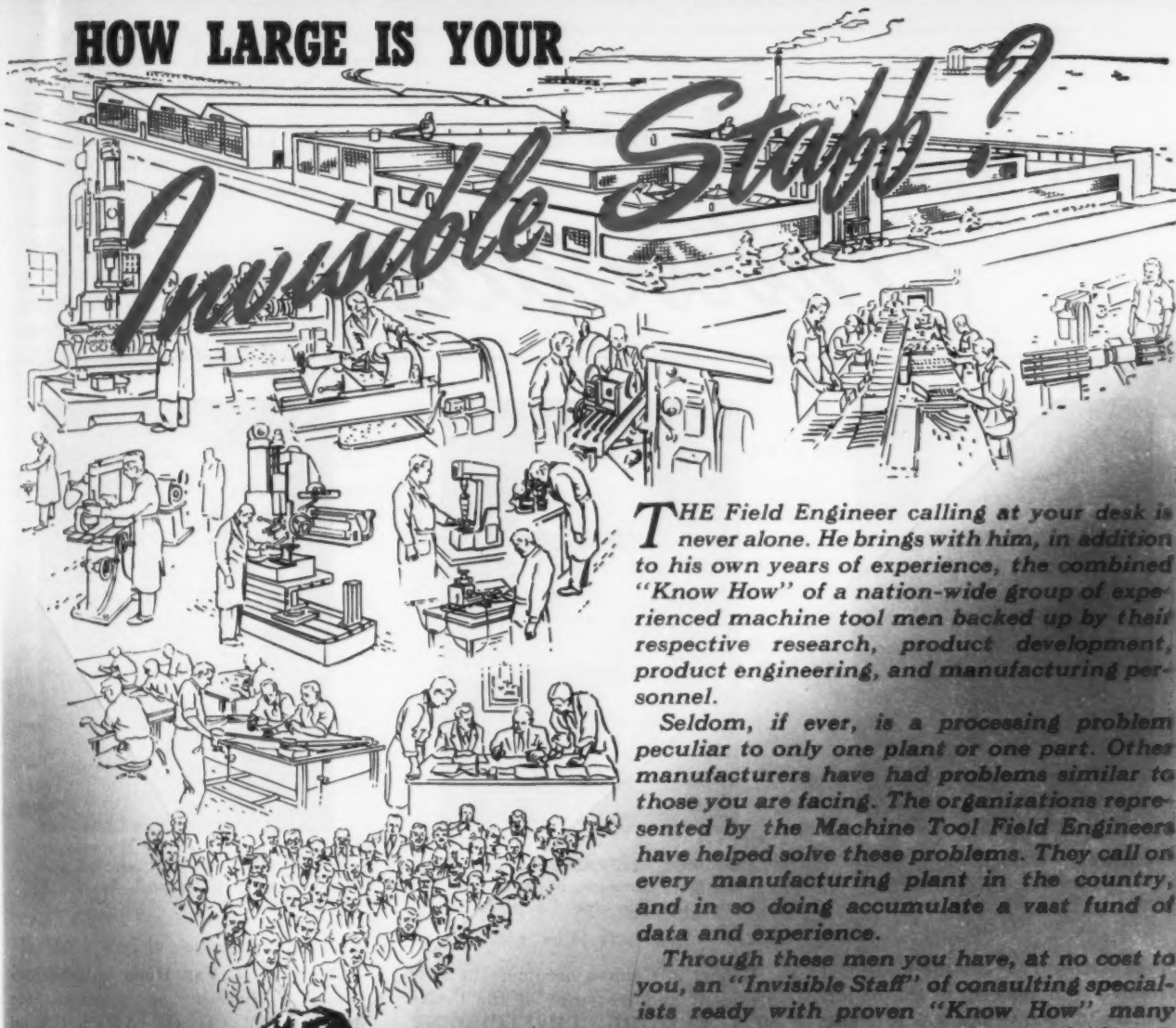
Type of Briquet	Gross Weight	Alloy Content
"EM" Silicon Briquets (two sizes) Round	5 lb.	2 lb. Silicon
	2½ lb.	1 lb. Silicon
"EM" Silicomanganese Briquets Square	3½ lb.	½ lb. Silicon 2 lb. Manganese
"EM" Ferromanganese Briquets Oblong	3 lb.	2 lb. Manganese

Table II. Typical Briquet Mixture for Soft Gray Iron

Base Charge		Material Charged	Alloys in Charge Material			
			Silicon		Manganese	
Per Cent	Lb.		Per Cent	Lb.	Per Cent	Lb.
40.0	400	Pig Iron	2.25	9.00	0.75	3.00
40.0	400	Return Scrap	2.50	10.00	0.65	2.60
20.0	200	Purchased Scrap	2.28	4.56	0.55	1.10
100.0%	1,000 lb.	Total Base Charge		23.56		6.70
Briquets Required		4 Small Silicon Briquets		4.00		—
		½ Silicomanganese Briquet		0.25		1.00
		Total Alloys Charged		27.81 lb. Si or 2.78% Si x .90		7.70 lb. Mn or 0.77% Mn x .85
		Melting Recovery Factor				
		Final Analysis of Iron		2.50% Si		0.65% Mn

HOW LARGE IS YOUR

Invisible Staff?



THE Field Engineer calling at your desk is never alone. He brings with him, in addition to his own years of experience, the combined "Know How" of a nation-wide group of experienced machine tool men backed up by their respective research, product development, product engineering, and manufacturing personnel.

Seldom, if ever, is a processing problem peculiar to only one plant or one part. Other manufacturers have had problems similar to those you are facing. The organizations represented by the Machine Tool Field Engineers have helped solve these problems. They call on every manufacturing plant in the country, and in so doing accumulate a vast fund of data and experience.

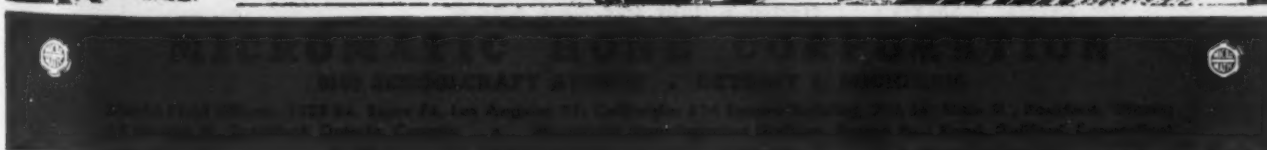
Through these men you have, at no cost to you, an "Invisible Staff" of consulting specialists ready with proven "Know How" many times greater than can be found within any one organization.

Your MICROMATIC Field Engineer represents an organization that has been the leader in the development and application of the Microhoning process for twenty years. He offers you a service that is available nowhere else in the world.

We are glad to be part of your "INVISIBLE STAFF".

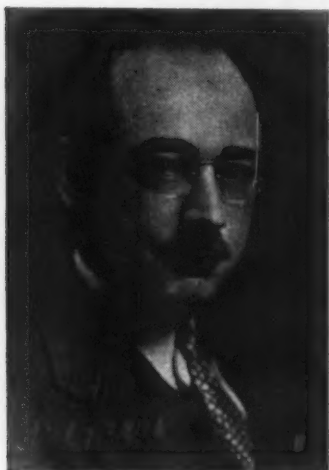


Write for a copy of the new *Cow-Hatch* on Microhoning Splines—JUST OFF THE PRESS



Iron Age

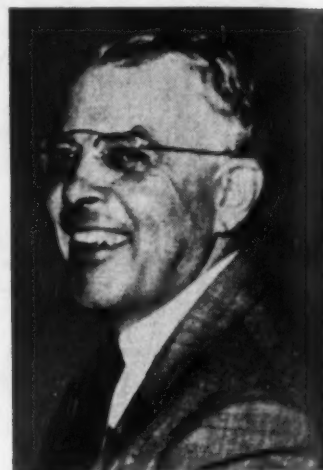
Introduces



JOHN N. WELSH, named associate director, Hall Laboratories, Inc.



GEORGE T. FRASER, appointed assistant manager of tool steel sales, Crucible Steel Co. of America.



HAROLD B. RESSLER, elected first vice-president, Joseph T. Ryerson & Son, Inc.

Fred M. Gillies has been elected executive vice-president of the **ACME STEEL CO.** Mr. Gillies was formerly works manager of the **INLAND STEEL CO.**, Chicago. He takes over the position which has been vacant since last fall when **Chester M. MacChesney** was elected chairman of the company.

G. L. Phillippe has been appointed department comptroller for **GENERAL ELECTRIC CO.'S** apparatus department, succeeding the late **G. S. Hyatt**.

Paul B. Kasakove has been named factory superintendent of the **Ediphone Div.**, **THOMAS A. EDISON, INC.**, West Orange, N. J.

F. J. Kilberry was appointed management consultant in charge of the **Superior Engine Div.** of **NATIONAL SUPPLY CO.**

Herman E. Bakken will become a vice-president and general manager of **ALUMINUM ORE CO.** effective Aug. 1 of this year. Since 1942 he has served as associate director of **ALCOA'S** research laboratories at New Kensington, Pa.

Robert J. Cannon becomes the new president and treasurer of the **CANNON ELECTRIC DEVELOPMENT CO.**, Los Angeles, following the death of **James H. Cannon**, former president and founder of the organization. Other officers recently elected are **Richard L. Rowen**, vice-president and production manager, and **John B. Miliken**, secretary.

W. E. Simms was made assistant manager of fleet sales in the general sales offices at Dearborn for **Ford Div.**, **FORD MOTOR CO.** **James J. Larkin** and **John W. Chenault** were appointed assistant managers of fleet sales to serve in the field.

J. W. Thomas was appointed sales engineer of the railway division at St. Louis and **Glenn E. Neal** was named sales engineer of the railway division at Chicago for **TIMKEN ROLLER BEARING CO.**

Merton B. Lilly was made head of the patent department of **WYANDOTTE CHEMICALS CORP.** He succeeds **William R. Day**, who was recently promoted to the post of assistant to the president.

Dr. Kent R. Van Horn will become associate director of research for **ALUMINUM CO. OF AMERICA** on Aug. 1 of this year. At present he is assistant director of research for the company, and has been in charge of **ALCOA'S** branch laboratories at Cleveland since 1945.

Richard E. Hoagland was named vice-president and assistant general manager of the **UTAH FUEL CO.**, a **KAISER STEEL CORP.** subsidiary.

G. G. Coolidge was made executive assistant to the president of **HARBISON - WALKER REFRACTORIES CO.** Mr. Coolidge had been a vice-president of the company since 1933 and continues to retain his directorship which he attained at the same time.

Vincent G. Bush has been named general superintendent of the Philadelphia office of **TURNER CONSTRUCTION CO.**

C. P. Berman has been appointed **WILLYS - OVERLAND EXPORT CORP.** manager in the Far East. When Mr. Berman returns to Asia his headquarters will be in Tokyo.

C. B. Vernooy, comptroller of the GENEVA STEEL CO., has been appointed assistant comptroller of U. S. STEEL CORP.

Charles A. Butcher will join the WORTHINGTON PUMP & MACHINERY CORP. as assistant to the president.

J. P. Barnum is sales representative of the Warren Steel Div. of COPPERWELD STEEL CO. in the New England area, and H. M. MacDougal holds a similar post in that territory for the Glassport Wire and Cable Div. of Copperweld.

Robert H. Madden, Jr., has been appointed manager of sales, manufacturing accounts, and John S. Thompson as manager of sales, merchant trade accounts, of COLUMBIA STEEL CO., San Francisco.

Edward Lee Soule, Jr., has been elected vice-president and general production manager for all plants of SOULE STEEL CO., with the three California plants and the Portland plant under his direct supervision.

A. H. Toronski was made chief engineer of SPEER CARBON CO., St. Marys, Pa.

Stanley B. White was placed in charge of the KAISER ALUMINUM & CHEMICAL CORP. rolling mill at Trentwood, Wash., succeeding John H. Meek who is resigning due to poor health.

A. S. Johnson was appointed general manager of the National Carbon Div. of UNION CARBIDE & CARBON CORP.

L. J. Amsdell becomes director of the pipe joint division of GATES ENGINEERING CO., New Castle, Del.



JOHN L. COTSWORTH, becomes manager of stainless steel sales, Atlas Steel Sales Limited, Welland, Ontario.

Iron Age *Salutes*

HARRY A. COOPER

HARRY A. COOPER, founder and president of the Cooper Alloy Foundry Co., Hillside, N. J., is often contradicted by his workers when he says that his success is attributable to Lady Luck and the sweat of very able assistants.

Mr. Cooper's men say that their boss was never loath to seek out Lady Luck by lending an attentive ear to pioneering schemes that had competitors clutching at his shirt tails. They add that Mr. Cooper's insight into unproved plans and his courage in acting upon them has transformed a small dark horse foundry employing eight men to one covering a broad three acres employing 400—from an unknown competitor to the leading producer of stainless steel valves, fittings and castings in the world.

Thirty years ago Harry Cooper decided that the life of a sales engineer, while having its good points, was not the shortest line to success. With a determined faith in the future of high cast alloys and a justified confidence in himself he went to Philadelphia to set up shop as a foundryman.

He was buffeted by depression but persisted, later moving his foundry to Elizabeth, N. J., and 10 years later to Hillside. All the time, Mr. Cooper was ostensibly having a furious flirtation with Lady Luck but actually exercising acumen and daring.

A lengthy list of important firsts credited to the Cooper Alloy Foundry Co. is evidence that Mr. Cooper's policy has paid dividends for his firm as well as for the entire alloy castings industry. These include Cooper Alloy's leadership in the jet engine centrifugal cast-



ings developments, research with oxygen injection, advanced pattern making techniques, unusual promotional campaigns, such as the nationwide stainless valve clinics, and the bold decision to build a high alloy foundry with its own complete manufacturing, machining, and testing facilities.

His past response to new ideas has led some crackpot inventors to the belief that Harry Cooper was a sucker for anything new. They changed their minds when they were subjected to his questioning and they unhappily learned that Mr. Cooper accepted new ideas because he thought they would work and he based his expert conjecture on a profound knowledge of the field. Little wool has been pulled over his eyes.

Today, as president of his company and of the Alloy Casting Institute, he is often asked by competitors as well as associates—“What next, Mr. Cooper?”



THOMAS Z. HAYWARD, named general manager of sales, Joseph T. Ryerson & Son, Inc.

John W. Lohnes has been appointed vice-president in charge of carbon and graphite sales for **SPEER CARBON CO.** and its subsidiary, **INTERNATIONAL GRAPHITE & ELECTRODE CORP.** **William E. Harvey** was made plant manager of all carbon and graphite plants of **Speer Carbon** and its subsidiaries, while **Robert E. Rice's** appointment as sales manager of **International Graphite** was also announced.

Robert H. Heppel has been appointed to head the Dallas operation of **DAVIES SUPPLY & MFG. CO.**

H. B. Scott, L. S. Johnson and **A. J. Popovich** were added to the sales force of **MICHIANA PRODUCTS CORP.**, Michigan City, Ind.

Charles L. Freel has been made administrative assistant to general sales manager **George E. Tubb**, **LORD MFG. CO.** His headquarters will be in Erie, Pa., home office of the company. **Everett C. Vallin** replaces Mr. Freel as Lord's Detroit representative.

Dr. Murray Senkus was appointed director of research and development for **NOX-RUST CHEMICAL CORP.**

A. E. Campbell was made sales manager of **CLAPP INSTRUMENT CO.**, Webster, Mass.

Glenn R. Kraus and **Ernest C. Hawkins** joined the sales force of **REES MACHINERY CO.**, Pittsburgh.

A. F. Boucher has assumed responsibilities as district manager in the Detroit area for the **LINCOLN ELECTRIC CO.**, Cleveland. **I. R. Batter** has been transferred from Grand Rapids to Milwaukee to assume the post of district manager in that area.

Iron Age Introduces

Continued from Page 55

Sheldon R. Coons was elected to the **KAISER-FRAZER CORP.** board of directors.

John C. McLeod has been appointed manager of belting sales for **RUSSELL MFG. CO., INC.**, Middletown, Conn.

Albert J. Maslin was appointed assistant to the engineering manager of **WESTINGHOUSE ELECTRIC CORP.**, Transformer Div., Sharon, Pa.

Mack Johns has been named Chicago regional manager for **American Central Div., AVCO MFG. CORP.** He succeeds **John E. Bogan**.

Kenneth F. Ode was appointed manager of operations for **CONTINENTAL FOUNDRY & MACHINE CO.**, with headquarters in Pittsburgh.

R. H. Olson has been elected president of **ELECTRIC MACHINERY MFG. CO.**, Minneapolis. He succeeds **W. H. Feldmann** who joined **WORTHINGTON PUMP & MACHINERY CORP.** as vice-president in charge of sales.

W. G. Young was appointed special representative assigned to general sales, with headquarters at the home office of **SHARON STEEL CORP.** **W. J. Thomas**, who has been assistant district manager of sales, has been appointed to succeed Mr. Young as district manager of sales of the Sharon district.



C. L. HARDY, appointed assistant to the president, Joseph T. Ryerson & Son, Inc.

Charles A. Dostal retired recently after completing more than 43 years of service with **WESTINGHOUSE ELECTRIC CORP.** Since 1943 he had been a vice-president of the organization.

Jack Ettinger was named regional representative in the New York metropolitan area for the **BENNETT MACHINERY CO.**, New York.

Henry P. Isham has been elected a director and member of the executive committee of **DRESSER INDUSTRIES, INC.**

Gene Rankin succeeds the late **Ernest Bernard** as Kansas City representative of **SYNTHANE CORP.**, Oaks, Pa.

Walter R. Hoffman, Lawrence M. Baker and **Robert A. Thompson** have been appointed to the junior board of directors of **DRAVO CORP.**

OBITUARIES

Fay Henry Willey, president and founder of **Willey's Carbide Tool Co.**, Detroit, passed away recently.

Joseph E. Holveck, hydraulic engineer, **Worthington Pump & Machinery Corp.**, died on May 20.

Walter Guy Robbins, president of the **Carboloy Co., Inc.**, Detroit, died on May 18 while on a business trip in Schenectady.

John A. Coakley, president, **Automatic Sprinkler Corp. of America**, Youngstown, died May 18 at the age of 68.

Edward W. Stephens, 51-year-old manager of belting sales for **Good-year Tire & Rubber Co.**, died recently.

Charles H. Awkerman, chairman of the board of **Udylite Corp.**, passed away recently.

Harry P. Hubbell, chairman of the board of **Brass & Copper Sales Co.**, St. Louis, died on May 17. He was 78.

Thomas B. Van Dorn, for many years head of **Van Dorn Iron Works**, Cleveland, died May 19.

Laurence F. Miller, executive vice-president of **Steel Service, Inc.**, Steubenville, Ohio, and vice-president of **Parkersburg Steel Co.**, Parkersburg, W. Va., died on May 13.

Edwin S. Webster, 82, former president and retired chairman of **Stone & Webster**, died recently at his home in Newton, Mass.

William Strachan Leslie, chairman of the board of **A. C. Leslie & Co., Ltd.**, Montreal, Canada, passed away after a lengthy illness at the age of 83.

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WILL GET YOU

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...WITH

N-A-X

HIGH-TENSILE STEEL

MAKE A TON OF SHEET STEEL
GO FARTHER

Specify

N-A-X

HIGH-TENSILE STEEL

GREAT LAKES STEEL

Corporation

N-A-X Alloy Division, Ecorse, Detroit 29, Mich.
UNIT OF NATIONAL STEEL CORPORATION

It's a fact. It's demonstrated every day, in the production of varied parts and products. *Three tons* of N-A-X HIGH-TENSILE steel are yielding as many finished units as were yielded formerly by *four tons* of carbon sheet steel!

This "new arithmetic in steel" is in step with industry's trend to the use of improved steels. When cold-rolled steel was found to be preferable to hot-rolled for many uses, industry substituted cold-rolled for hot in these uses. Today, it is equally logical and economical to replace simple carbon sheets with low-alloy high-tensile.

N-A-X HIGH-TENSILE makes it possible to reduce sections by 25% ...and *still provide* greater strength and durability than can be obtained with thicker sections of mild-carbon steel! Each ton of N-A-X HIGH-TENSILE steel represents a potential 33% increase in finished goods. Manufacturers are finding that N-A-X HIGH-TENSILE enables them to get 33% greater usefulness out of steel supplies.

Investigate this great opportunity to make each ton of sheet steel go farther...through the superior quality of N-A-X HIGH-TENSILE.

June 1, 1950

57

On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

Automatic transmission talk grows . . . Packard Ultramatic gets \$7 million . . . Chrysler output rises . . . More hard-tops coming . . . Buick buyers get 14,000 combinations



By **WALTER G. PATTON**

GM Transmission — There is much talk here in Detroit about automatic transmissions. GM is reported moving ahead with an improved design utilizing the best features of the torque converter and Hydramatic. Details are still unconfirmed, but this much is definitely known: Most of the emphasis will be to design a unit that will give improved efficiency—better gas mileage. Secondary considerations are (1) smooth performance, (2) simple construction and, therefore, low cost. Best guess now is that a new GM transmission is at least 8 months away.

Diecast Doors — Diecasting is moving ahead rapidly in the auto industry. Investigation of the possibilities of diecast inner door frames for cars is being carried on by several important companies. Kaiser-Frazer and Nash both

are reported to have important diecast developments under way. Some interesting diecastings and processing innovations at the new Ford Monroe plant are anticipated by the trade.

Engine Delay—Chances are the new high compression engines will go into actual production later than was originally anticipated. There are several reasons: (1) machine tool shops are badly jammed, (2) engineering changes are still being made, (3) fast selling cars do not encourage fast model changes.

While certain engines including the Ford Six and Eight, Lincoln, Mercury, Chrysler, Studebaker, Kaiser-Frazer, and Willys will definitely move over to new designs and higher compressions, there is still plenty of resistance to a change by several producers.

Ultramatic — Packard's investment in its new Ultramatic drive is \$7 million, Detroit newsmen learned this week. To date 30,000 units have been produced, and 85 pct of the 1950 Packards are so equipped.

Packard officials say they have no intention of selling the transmission to any other car maker although other auto firms are reported to have tried to buy the Packard device.

Packard Workers—The employment provided by a new automatic

transmission is surprising. In Packard's own plant, nearly 10 pct of all workers are employed on the Ultramatic drive. This is exclusive of field service men, machine tool suppliers and vendors who furnish many important parts, including castings, steel for shafts, seals and many other details.

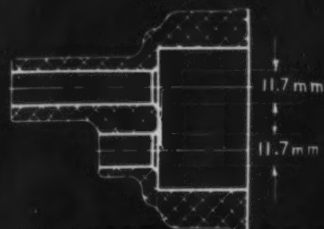
The Packard assembly (IRON AGE, March 16, 1950, page 58) is unique in the industry. A merry-go-round conveyer fed by sub-assembly lines turns out 40 units per hour. Workers ride on the conveyer, assembling the unit as it moves around the final line.

Transmission Sale—Some sources believe the next sale of a transmission will be that of the GM Hydramatic to Hudson.

Teletype Network—Ford's new teletype relay center with 18 duplex and 31 simplex privately leased circuits is said to be the largest in the world. Where circuits are busy, the new equipment stores the message until the circuit is clear. Transmission is entirely automatic.

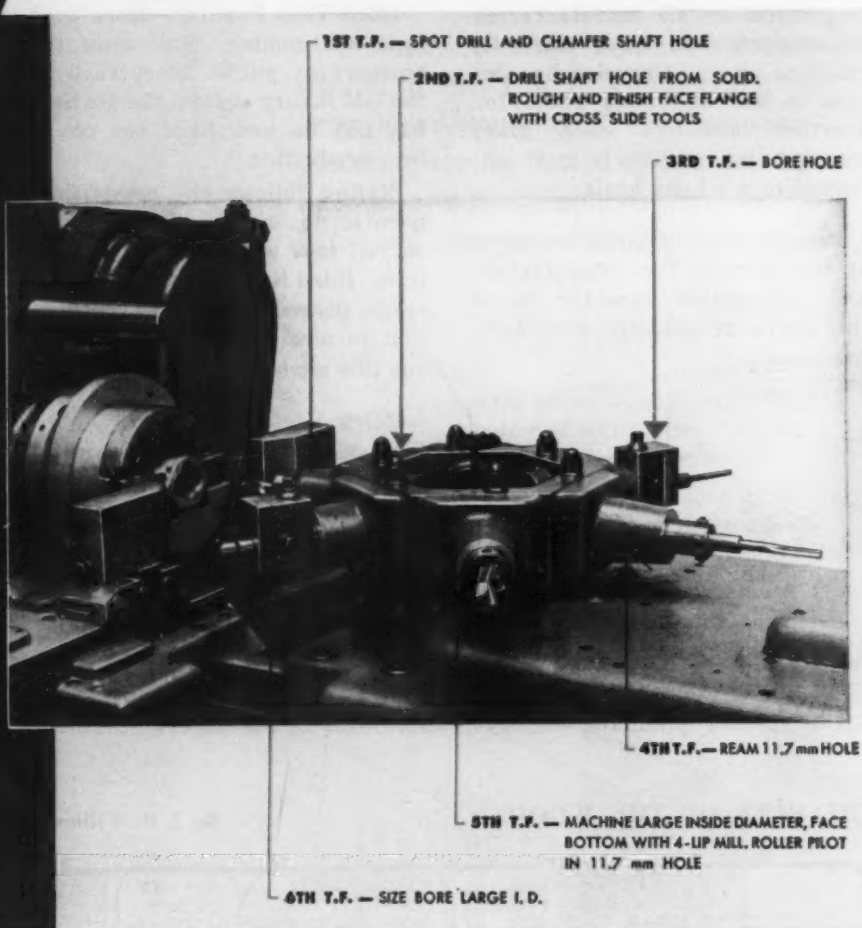
The new network links 59 Ford field offices with Dearborn. A similar message can be sent to a number of stations using special equipment that connects each of the stations, and when all are connected, sends the message simultaneously to all points on the hookup.

TWIN OPERATIONS IN One SETTING



ON THE POTTER & JOHNSTON 3U AUTOMATIC

Pictured is a typical tooling setup, turret face by turret face, for profitably machining aluminum oil pump bodies on the 3U AUTOMATIC, as shown by heavy lines in the drawing. After machining the first bore during the first turret cycle, special fixture indexes work 180° for machining second bore during the second turret cycle . . . twin operations in one setting!



LET POTTER & JOHNSTON engineer a similarly profitable tooling setup for you — on any high speed, multiple operation work from a few ounces to several hundred pounds . . . for better work . . . and more of it . . . to greater precision with fewer rejects . . . at the lowest possible cost per unit. Our recom-

mendations will include detailed cost-and-time figures based on eliminating unnecessary work handling, combining cuts, reducing machining times. Just send us prints, or a sample of your work.

P&J

50 YEARS' EXPERIENCE
IN TOOLING FOR

Precision + Productivity + Economy

**POTTER &
JOHNSTON CO.**

PAWTUCKET, R. I.

Subsidiary of PRATT & WHITNEY
Division Niles-Bement-Pond Company



Top Production—Following the 100-day strike, Chrysler hit its peak production in only 3 days. The present setup calls for at least two shifts in all manufacturing departments and three shifts in machine shops. Chrysler has denied it has ambitious plans for overtime although each plant working two shifts is now extended to a 9-hour basis.

Pension Talk—Detroit members of the Cutting Tool Manufacturers' Association recently heard this advice on pensions from L. S. Aspinwall:

- (1) Don't try to guarantee both fixed pension sums and also fixed wage contributions.
- (2) Keep pension plan contracts separate from regular union contracts.
- (3) Amount of the pension payment should vary to some extent with the worker's earnings.

The speaker predicted employ-

ment for older men will become more difficult as pension plans become more common.

Hard Tops Popular—More hard tops are coming. Following the tremendous public acceptance of the GM luxury sedans, the De Soto has put its new hard top coupe into production.

Styling follows the established trend: no center body posts, curved rear window, fancy inside trim. Hard top production has already passed convertible production in most auto plants turning out this model.

Buick Variety—The late Henry Ford once said, "You can have any color you like as long as it's black." Today, Buick claims to be offering 14,000 possible variations in its cars. Its 1950 line includes 32 models, 15 colors, 30 upholstering combinations and 21 different accessories.

An "electric brain" sorts orders according to the buyer's specifica-

tions which have been punched on a card. Teletypes are used in the plant to control assembly of the car precisely according to the buyer's specification.

Magnesium Uses—Here are some of many uses reported for magnesium by the magazine "Magnesium" for May: catcher's mask, tree saw (all but the blade); turret sections of a B-36; light weight teletypewriter; magnesium bridges to span loading docks. Complete structural properties are also given in the May issue.

Long-Wear Fenders—Rubber fenders for street cars are an accomplished fact. Trial tests have been so successful that rubber fenders have been specified on 106 new cars purchased by Detroit Street Railway Department.

The rubber fender is mounted over the wheel on the street car truck to protect electrical equipment from splashing mud, water, oil and grease. The rubber fender wears longer than metal and cuts maintenance expense.

THE BULL OF THE WOODS

By J. R. Williams



Strike Loss—The prolonged Chrysler strike slashed sales and earnings of the Electric Auto-Lite Co. for the first quarter of 1950, announced Royce G. Martin, president and board chairman. Further production drops were averted by the building up of inventories.

Net sales for the first 3 months were \$37,486,817 and net earnings were \$1,629,446, or \$1.09 per share. Sales in the first quarter 1949 were \$52,321,459 and earnings, \$2,203,853.

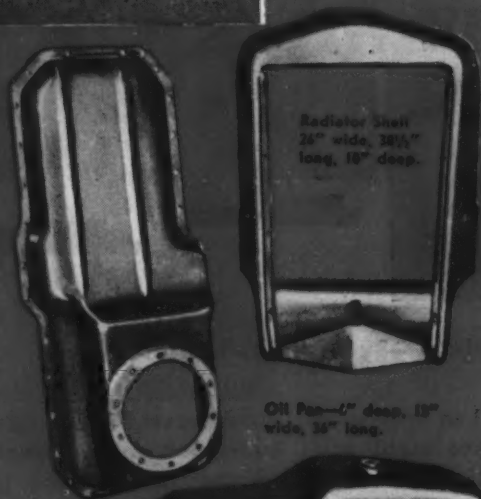
Awards—Chevrolet wholesale branch employees will get graduated awards based on length of service at a series of banquets sponsored under the new Chevrolet Leaders Organization program. The Chevrolet Leaders Quarter Century Club will meet in Detroit to honor 36 men in the sales department from 25 to 39 years. The company will give recognition to 955 employees this year.

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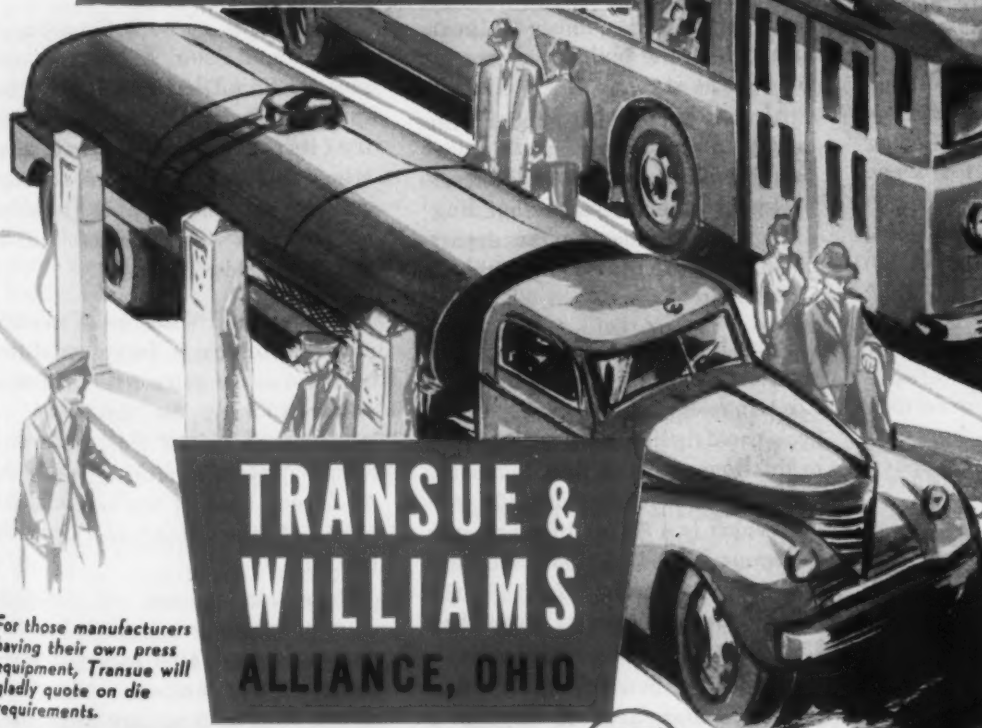
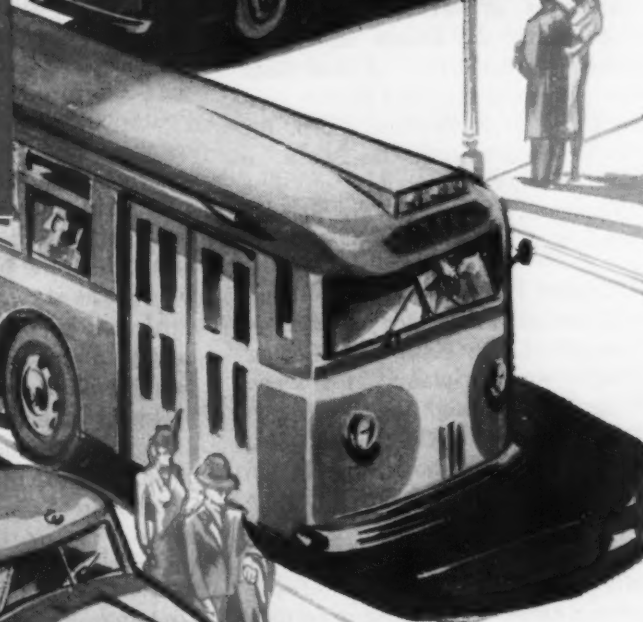
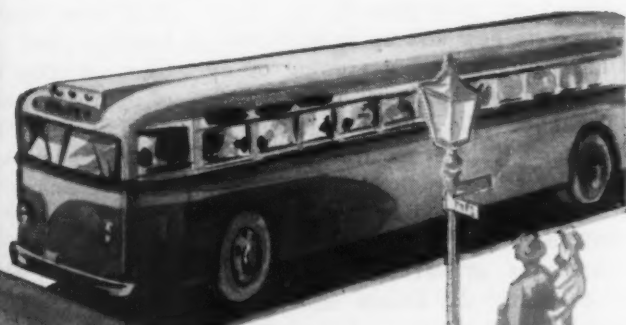
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June 1, 1950

WEST COAST PROGRESS REPORT



Digest of Far West Industrial Activity—By R. T. REINHARDT

Reversing Economics — Kaiser Steel Corp. steel plate for gas line contracts now add up to \$100 million with the recent signing of a \$35 million contract with the Trunkline Gas Supply Co. for a Texas to Illinois natural gas line. The latest order, involving 255,000 tons of pipe for the 1300 mile line, will be fabricated in the Kaiser Basalt Co., at Napa, Calif.

Presently the Kaiser mill is delivering 470,000 tons of steel plate for pipe manufactured by the Consolidated Western Steel Corp. for the Transcontinental Gas Pipe Line Co. Freight reductions on pipe shipments to the east are helping western fabricators compete.

Copper Prospects Shine—Booming demand for copper assured operation of the Kennecott Copper Corp.'s western plants on a 6 and 7-day basis through the third quarter of '50, said Charles R. Cox, new president who resigned the presidency of Carnegie - Illinois Steel Co.

In a Salt Lake City interview, Mr. Cox said that return of the copper tariff would pose a serious problem for inflation - harassed Chile, a major American supplier during the war.

Boeing Contract Settled — Two years and 28 days after having called a strike against the Boeing Airplane Co., Aeronautical Mechanics Industrial Lodge (Local 751, IAM) finished negotiating a new contract.

Wage scale, covering about 11,700 employees, stays the same, ranging from \$1.15 to \$1.95 a hour

and the plant is still an open shop. Employees were given eight paid holidays and additional vacation time. It gives them a rate increase of approximately 5¢ per hour. The holiday clause has an unusual feature—the workers get the Friday after Thanksgiving Day as a holiday in place of Armistice Day.

Construction Impetus — An appreciable boost in heavy construction may result from a decision of the California State Supreme Court which has approved the procedure whereby the state purchases land, a private investor constructs a building and leases it to the state for a stipulated number of years after which the building ownership goes to the state.

Already scheduled under this new plan are two state highway patrol buildings; a \$6 million department of employment building; a \$3 million annex to the department of agriculture building in Sacramento.

Peak Expected — Reports from southern California indicate that Los Angeles County anticipates a peak construction year with permit evaluations for the first 3 months reported as in excess of \$300 million which is a 36 pct increase over the same period of 1949 and tops the first 4 months of 1948, the county's record year, by more than \$2 million.

Residential building in the San Francisco Bay area is setting a new high with 55 pct more permits during the first quarter than in 1949.

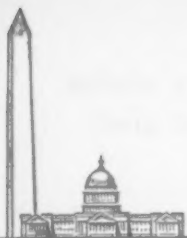
Aircraft Views — Robert Gross, president of Lockheed Aircraft Corp., Los Angeles, predicts Air Force and Navy appropriations for aircraft procurement will be considerably larger than recent budgets with a marked effect on the strength of the nation's air defenses.

Lawrence Bell, president of Bell Aircraft, reports that the U. S. Air Force is now concentrating on five high speed research projects for fighter craft. Three of these are being carried on by Bell, one by Douglas and the fifth by Northrup.

Executives of both Consolidated Vultee and Solar Aircraft companies of San Diego recently urged that the Federal government clarify its tax structure and thus stimulate venture capital for new enterprises and enable business management to foresee trends which are now confused.

Nonferrous Notes — Titanium now is available in large quantities in the Los Angeles area and new research must be developed to make better use of this metal and reduce its cost according to Dr. A. M. Zarem, head of the Los Angeles office of the Stanford Research Institute.

Reduction in cost of painting aluminum siding is reported in the Spokane area which makes it competitive to lumber. Aluminum plates, 4 in. by 6 in., are being considered by the Spokane postoffice for use as tabs on which collection hours are indicated.



THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

By EUGENE J. HARDY



Allocation Power Suspended—

Extension of the draft law until June 30, 1952, with inductions suspended unless authorized by Congress, means that the "draft industry" and "steel allocation" provisions of the law will also be suspended unless Congress declares a national emergency. These never-used provisions have been in the act since 1948.

No case of plant seizure for failure to fill military orders for steel or other materials has been recorded. The Administration position has been that these provisions would not be invoked short of war. Under the amended law, this power will be in the hands of Congress rather than the White House.

New Cost-of-Living Factor—Expense of maintaining the family car is about to be officially recognized as a definite cost-of-living item. The Bureau of Labor Statistics plans to set up a new index to show the rise and fall of general service costs.

It will include the more frequent and important operations such as brake, valve, ring and grease jobs—perhaps ten in all. Chief significance may lie with the movement to tie wages to the cost-of-living level.

"Iron Curtain" Exports —A group of Republican senators is disturbed over what it calls the "large amounts" of iron and steel products that are continuing to be shipped to Iron Curtain countries from U. S. ports. The Commerce Dept. claims that such shipments have been prohibited for months.

The Senatorial charge is that

Federal export controls are so inefficiently applied that the Commerce Dept. actually doesn't know the final ports of destination for a good many of the shipments it licenses. A further tightening of controls is sure to result from an airing of the charges.

Crusade Against Mergers—The Federal Trade Commission's long fight to bar firms from acquiring the physical assets of competitors is likely to hit pay dirt before Congress adjourns. The Senate now has before it an amendment to the Clayton Act which would prohibit such mergers if they would lessen competition.

The bill passed the House last year and opponents on the Senate side concede that the Senate will pass the measure if it comes to a vote. The Clayton Act now prohibits the acquisition of stock of a competing firm. FTC holds that the assets amendment would merely close a loophole in existing law.

Tin Extension Likely—Chances that Congress will keep the Reconstruction Finance Corp. in the tin business for at least five more years are good. RFC, which has been operating the government-owned tin smelter at Texas City, Texas, since the war, wants this power extended to 1956.

Its current authority doesn't expire until June 30, 1951, but the

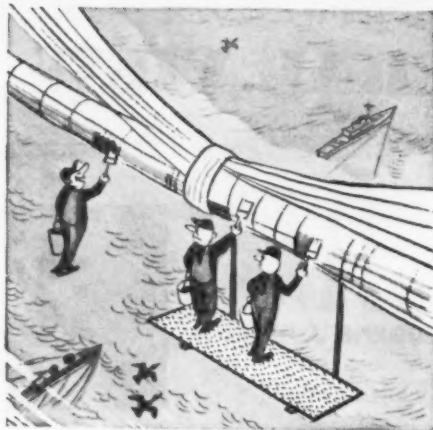
agency points out the difficulty of contracting for imports of tin ore on a short-term basis. Harley Hise, RFC chief, told the Senate and House recently that the government's options to buy a "substantial part" of its 1951 ore will expire October 15.

Reorganization Angles—Senate approval of the President's proposal to reorganize the Federal Trade Commission might appear to place the upper chamber in a position of being inconsistent.

Earlier, the Senate had turned down reorganization plans for the Interstate Commerce Commission and the Federal Communications Commission, giving added power for the Chairman and Presidential authority to name the Chairman. Reason for this seeming inconsistency is that transportation, notably railroad, and radio lobbies fought the latter proposals to the bitter end. They were successful.

Critical Chromite —Diplomatic sources say that Pakistan, which is finding a ready market in the United States and Britain for all its Baluchistan chromite, is taking steps to check slumping production and increase its output.

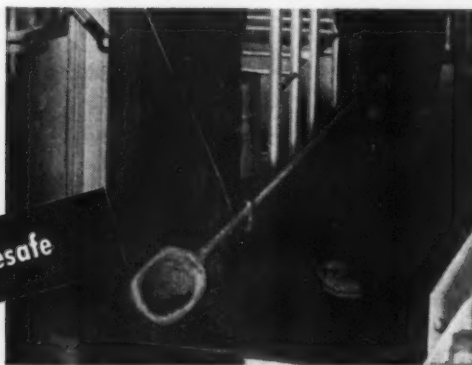
The 1949 production was down a third from prewar and Pakistan would like to produce at least 45,000 tons for export. Chromite is badly needed for the national stockpile.



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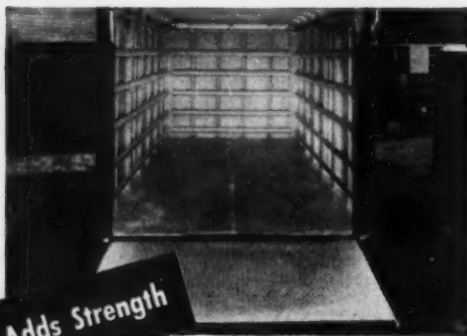
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HOW CHEVROLET MACHINES ITS NEW TRANSMISSION

The plant originally built to manufacture a new light car now machines and assembles the Chevrolet Powerglide transmission. Standard and special machines are teamed for efficient performance of nearly 500 operations. Complete machining operations on the two largest parts, the bell housing and the transmission case, are traced in this first part of a two-part article.

OVER 150,000 sq ft of floor space and more than 350 major pieces of equipment are used to produce components and sub-assemblies for the new Chevrolet transmission. Nearly 500 operations are performed in the production of this unit at the Chevrolet-Cleveland Mfg. Div. alone. A portion of this Cleveland plant is now devoted to machining and assembly operations on the new Powerglide transmission.

Eight washers insure clean parts at every assembly and subassembly point. Practically every machine has an inspection activity connected with its operation. There are many specially designed testing machines. Ten of them are in positions that key them to important operations. There are nine final assembly test machines. This number does not include the eight special units in the gear laboratory, where periodic checks are made on the involute form, helical angle, and tooth spacing of the gears.

Production lines are arranged so that the heavier castings—the bell housing and transmission case—occupy the south side of the area,

nearest the receiving dock. Next to them are production lines for some of the smaller castings. The western part of the plant is occupied by lines that produce the valve body, the side covers, the modulator housing, and similar parts. The area to the north of the casting machining lines is given over to the machining of torque converter parts and the production of steel parts such as gears, shafts, and the planet carrier. The heat treat section is at the west end of these lines, with the assembly room extending across the westward corner beyond.

Rough machining begins at the end of the plant near the receiving room. Parts progress toward the other end where the assembly room is located.

Since the basis of torque converter operation is hydraulic, and since the fluid used is oil working at high pressures, the containing unit must be leak-proof. This means close fits on all surfaces brought together. These close fits require special processing of the cast iron housings and parts. Metal surfaces must be clean at all times

and machines must be capable of fine finishes at production rates. The setup in operation at Chevrolet-Cleveland satisfies these conditions. It is turning out units at high production rates and low reject levels. Typical machining and assembly operations are those performed on the bell housing, transmission case, valve body, primary pump, and planet carrier. These will be discussed in detail.

All castings are normalized and cleaned in a continuous automatic operation that conveys the parts through (1) a furnace, (2) a salt bath containing Virgo salts, (3) an acid dip, (4) a hot and cold rinse, and (5) a concluding oil bath. In addition to normalizing, this combination treatment removes entrapped and superficial sand from the castings. The two largest castings, the bell housing and the transmission case, are percentage Magnaflux inspected after normalizing.

The front face of the bell housing is machined to critical dimensions since all subsequent locations are made from this face. The front end of this housing couples to the engine.

Transfer Line for Bell Housing

Both bell housing and transmission case proceed through a number of operations on standard and on special machines. A special transfer line for the bell housing has 14 stations and operates 89 drills, reamers, facers and other tools.

The bell housing is face turned and bored on an 8-station Bullard Multi-Matic double-indexing vertical turret lathe. At station 3 the part is rough turned and the flange face and pilot diameter cut. At station 5 the pilot diameter and top are finished. At station 7 the flange face is finished and the pilot hole chamfered and rough bored. The part is then turned over manually. At station 4 the transfer end is faced and the bore is chamfered. At station 6 the transfer face is finished. At station 8 the hole is bored and reamed and the part is unloaded.

The right and left cover faces of the bell housing are finish milled on a Sundstrand Duplex Rigid-Mil machine using two 8-in. diam face mills with 20 carbide blades. The housing is then drilled, reamed, and chamfered in a 4-station vertical W. F. & John Barnes Co. transfer machine.

Most of the remaining holes in the bell housing are drilled and tapped on the right and left sides, and front and back, in a 14-station W. F. & John Barnes Co. transfer type machine having 89 tools, see Fig. 1. All tools are guided in bushings mounted in bushing plates in the fixture. Operation of the machine is remotely controlled by pushbuttons. A drag type chip conveyor runs through the entire length of the machine.

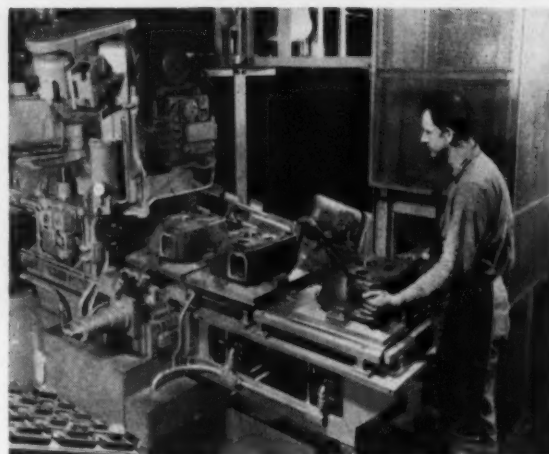


FIG. 1—The 15-station W. F. & John Barnes transfer machine on bell housings. A total of 89 drills, counterbores, spot facers, taps, etc., are teamed for pushbutton operation.

The machine has ten spindle heads. Spindle No. 30 is a single spindle ram-type unit. No. 31 is a 2-spindle head. No. 32 is a 6-spindle head. No. 33 is a 3-spindle head. No. 34 is a 39-spindle head. No. 35 is a 2-spindle master lead screw tap head. No. 36 is a 15-spindle master lead screw tap head. No. 37 is an 8-spindle head. No. 38 is a 6-spindle master lead screw tap head. No. 39 is a 7-spindle master lead screw tap head. The drilling and tapping operations are shown in Table I.

Parts passing through the machine are mounted in transfer fixtures. The fixture-mounted parts are indexed from station to station by means of a hydraulically actuated pusher bar. Transfer fixtures are located in each of the working stations by two dowel pins. They are held rigidly during machining by hydraulically actuated clamps. Transfer fixtures are arranged to locate the part (1) from the finished bore in the small end of the part, (2) from the finished flange face on the large end of the part, and (3) from one dowel pin, for radial location. Fifteen transfer fixtures are provided. Fourteen carry parts being machined. One carries the finished part to the unloading end of the machine. Re-loading starts the cycle again.

The return conveyor is timed with the machine. A hydraulic cylinder kicks the part and transfer fixture from the return elevator over to the loading station.

The rear face is finish ground on a Blanchard No. 11 rotary grinder. Pilot face is finish faced in a vertical-spindle Sundstrand Rigid-Mil using 6-in. diam carbide face mills. A narrow flange is left on the inner circumference when the face is finished. Since the flange completes the coupling it must be held to a limit of 0.002 in. on a diameter of 14 in. A special head was designed in the shop to accomplish this tolerance requirement. At final inspection, the bell housing is checked with pin, thread, plug and snap gages.

TABLE I

BELL HOUSING

Operations on 14-Station W. F. & John Barnes Machine

Station	Left Hand Operation	Right Hand Operation	Vertical Operation
1		Load and unload.	
2	Idle.	Idle.	Idle.
3	Idle.	Idle.	Idle.
4	Drill 1 hole $\frac{3}{16}$ in. diam x $1\frac{1}{4}$ in. deep, using spindle No. 30.	Drill 1 hole $\frac{9}{16}$ in. diam x $1\frac{11}{16}$ in. deep, using spindle No. 31.	Idle.
5	Drill and chamfer 6 holes for $\frac{5}{16}$ -18 tap, using spindle No. 32.	Drill 1 hole $\frac{9}{16}$ -in. diam to depth, using spindle No. 31.	Idle.
6	Idle.	Idle.	Idle.
7	Idle.	Drill 1 combination hole to 0.885 and 0.870-in. diam. Counterbore $\frac{7}{32}$ -in. deep with 15° chamfer using spindle No. 33.	Drill 7 holes for $\frac{3}{8}$ -16 tap, using spindle No. 34. Drill $2\frac{9}{32}$ -in holes by $\frac{5}{8}$ in. deep and chamfer. Drill and chamfer one $1\frac{9}{32}$ -in. diam hole. Drill one $1\frac{13}{32}$ -in. diam hole x $\frac{5}{8}$ in. deep and chamfer. Drill one hole $\frac{37}{64}$ through. Drill and chamfer two holes $1\frac{11}{32}$ -in. diam x $\frac{5}{8}$ in. deep. Drill one hole $\frac{5}{8}$ -in. diam x $\frac{9}{16}$ in. deep. Tap drill four holes 0.201-in. diam x $1\frac{11}{16}$ in. deep.
8	Idle.	Drill 2 combination holes and chamfer $1\frac{1}{16}$ in. deep for $\frac{1}{4}$ -20 tap, using spindle No. 33.	Chamfer 7 holes and tap $\frac{3}{8}$ -16 in. threads, using spindle No. 34. Drill and chamfer two holes for $\frac{1}{4}$ -20 tap. Chamfer four holes for $\frac{1}{4}$ -20 tap. Ream one hole to 0.6248 to 0.6246 in. Ream one hole to 0.4378 to 0.4376 in. Ream two holes to 0.3706 to 0.3704 in. Ream two holes to 0.3083 to 0.3081 in. Drill and chamfer one hole for $\frac{3}{8}$ -16 in. tap.
9	Idle.	Tap two holes $\frac{1}{4}$ -20 in. using spindle No. 35.	Idle.
10	Idle.	Idle.	Idle.
11	Idle.	Drill and chamfer six holes for $\frac{5}{16}$ -18 tap, using spindle No. 37. Drill one hole 0.339-in. diam x $\frac{9}{16}$ in. deep.	Tap eight holes $\frac{3}{8}$ -16 thread using spindle No. 36. Tap six holes $\frac{1}{4}$ -20 thread. Tap one hole $\frac{3}{8}$ -18 pipe thread.
12	Idle.	Drill one hole $\frac{3}{16}$ -in. diam in depth, using spindle No. 37.	Idle.
13	Tap six holes $\frac{5}{16}$ -18 thread, using spindle No. 38.	Tap six holes $\frac{5}{16}$ -18 thread, using spindle No. 39. Tap one hole $\frac{1}{8}$ -27 thread.	Idle.
14	Transfer plate is automatically returned to conveyor.		

Machining the Transmission Case

The transmission case is machined in various standard production machines and in two Cross transfer-type machines. The front holes, hubs, and bosses are rough and semifinished on an 8-spindle Bullard Multi-Matic. The rear pump body face is rough and semifinished; the bore of rear pilot hole is rough and semifinished; the O ring is roughed and finished; two holes are chamfered 30° ; and the end is faced holding the 12.920 in. dimension on a 16-in., 6-spindle Bullard machine. After the case is face ground, the servo cover face, support pads, and bosses are milled on a 3-spindle Sundstrand Rigid-Mil.

Front face holes and angular holes are finish drilled, spot faced, and reamed on a 5-station Cross drill machine, see Fig. 2. The transmission case is loaded at station 1. The part is placed on two loading rails with its small rear face down. After the part is slid into the fixture, a hand operated, cam controlled lifter plate raises the casting so that two locating pins enter holes in the top face. After the part is located and clamped, a remote control button is pushed to start the cycle. No time is lost during loading and unloading, since the machine is in continuous operation.

Station 2 of the Cross drill machine has two

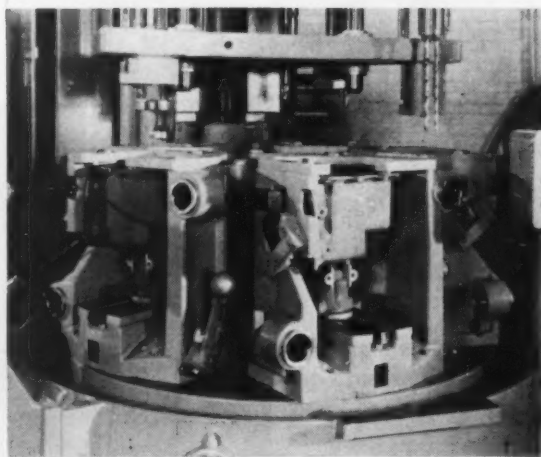


FIG. 2—Closeup of the Cross 5-station drilling machine which drills, spot faces and reams the transmission case. The table is indexed by a fluid motor.

single-spindle, angularly mounted heads. Station 5 has one 4-spindle horizontal head. The 24-spindle vertical head operating simultaneously at all four cutting stations feeds down at a rate of 5.87 ipm. This multi-spindle head contains drills and reamers from $5/16$ to $5/8$ in. diam. The $3/8$ -in. diam drills in the angular heads at station 2 are

fed at 4.89 ipm. The four drills in the horizontal head are fed into the casting at the rate of 5.1 ipm. Two holes, one $\frac{3}{8}$ and one $\frac{9}{16}$ -in. diam, are progressively drilled to required depth of $6\frac{3}{4}$ in. at stations 2, 4 and 5.

The 5-station table is automatically indexed by a fluid motor. The fluid motor drives a worm and worm-wheel directly connected to a pinion that rotates a large ring gear. The arrangement allows acceleration as the table starts, and deceleration as the table comes to each station. It is accurately stopped by a cam-operated limit switch. A pin in sequence with the rotating mechanism provides the final precise location.

Holes are drilled, reamed, bored and tapped in the rear end and sides of the transmission case on a 15-station Cross Transfer-Matic. The 84 tools in this machine permit short cycle operation in producing the remainder of the castings 48 different holes. Fig. 3 shows the operator loading and clamping the cast iron transmission case in a pallet-type fixture. The cycle time for the longest operation is 34 sec. Two seconds are required for clamping and two for unclamping. Five seconds are required for transferring from station to station. The total resultant machining

time is 43 sec. Two operators run the machine, see insert. One loads while the other unloads and runs the tapping machine.

After the two retaining clamps are tightened, the fixture is hydraulically transferred to station 1. The transmission case fixtures are transferred from station to station by a hydraulically actuated bar with projecting fingers that extend the length of the machine beneath the fixtures. The bar is brought back to start position after a 90° rotation that clears the fingers from the path of the fixtures.

Locating Fixtures

The transmission case fixtures are accurately located in each station of the Cross machine by hydraulically actuated pins that enter holes in opposite corners. The same hydraulic cylinder simultaneously actuates cam leverage clamps that contact the top of the workpiece (the rear end of the transmission case) for additional locating and clamping of the part to the fixture and ways of the machine.

This 15-station machine is equipped with 13 standard machining heads, lettered A to M. The sequence of operations performed on the transmission case in the Transfer-Matic appear in Table II. Stations 10 and 11 are idle and are used to collect chips that are conveyed from both ends by screw type chip conveyers. Chips are carried away from the machine by another conveyor that is located below the floor level of the machine under these stations.

After the transmission case emerges from the Transfer-Matic and is placed in the tapping machine, the operator presses a cycle release button that permits the operator at the front of the

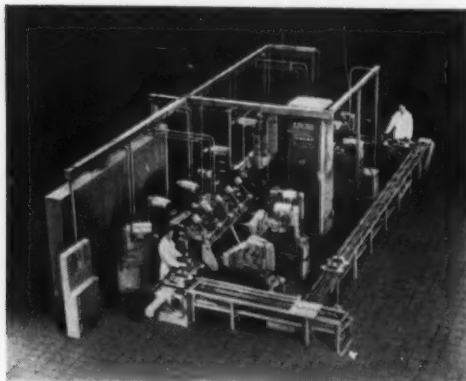


FIG. 3 — This 16-station Cross Transfer-Matic working on transmission cases uses 84 tools. It has a 43-sec cycle. The insert shows how just two operators run the unit.



TABLE II

TRANSMISSION CASE

Operations on 15-Station Cross Transfer-Matic

Station	Head	Holes		Operation
		Number	Size, in.	
1.....	A, H	2	$\frac{7}{16}$	Drill
2.....	A, H	2	$\frac{13}{16}$	Counterbore
2.....	B	2	$\frac{1}{4}$	Drill
2.....	B	1	$\frac{3}{8}$	Drill
3.....	B	1	$\frac{1}{4}$	Drill
3.....	B	1	$\frac{3}{8}$	Drill
3.....	B	1	$\frac{1}{2}$	Drill
3.....	K	1	$\frac{1}{2}$	Drill
4.....	C	1	$\frac{5}{16}$	Drill
4.....	K	1	$\frac{3}{4}$	Drill
5.....	C	1	$\frac{3}{8}$	Drill
5.....	C	1	$\frac{1}{2}$	Drill
5.....	L	1	$\frac{13}{16}$	Counterbore
6.....	E	1	$\frac{9}{16}$	Ream
7.....	I	1	$\frac{1}{4}$	Drill
7.....	I	3	$\frac{5}{16}$	Drill
7.....	I	1	$\frac{1}{2}$	Drill
7.....	I	1	$\frac{3}{8}$	Drill
7.....	I	1	$\frac{9}{16}$	Drill
8.....	D, I	17	$\frac{17}{64}$	Drill
8.....	I	2	$\frac{21}{64}$	Drill
8.....	D	1	$\frac{3}{8}$	Drill
8.....	I	1	$\frac{1}{4}$	Spot-Face
9.....	D	1	$\frac{17}{64}$	Drill
9.....	I	3	$\frac{5}{16}$	Drill
9.....	I	1	$\frac{11}{32}$	Drill
9.....	D, I	4	$\frac{3}{8}$	Drill
9.....	D	2	$\frac{29}{64}$	Drill
9.....	I	1	$\frac{29}{32}$	Counterbore
12.....	J	1	$\frac{5}{16}$	Drill
12.....	F	14	$\frac{3}{8}$	Countersink
12.....	F	2	$\frac{7}{8}$	Ream
13.....	J	1	$\frac{7}{8}$	Spot-Face
13.....	F	1	$\frac{25}{32}$	Drill
13.....	F	2	$\frac{33}{16}$	Bore
14.....	G	1		Recess
14.....	G	2	$\frac{3}{4}$	Bore
15.....	M	1	$\frac{13}{16}$	Tap
15.....	G	2	$\frac{3}{4}$	Bore

Heads A to G, inclusive, are mounted on the left-hand side of the machine; head I is vertical; and heads H, J, K, L and M are mounted on the right-hand side of the machine. Cutting speeds in afpm, are: Taps, 40; reamers, 75; drills, 80; counterbores, 150; and boring tools (roughing), 200 and (finishing) 300.

machine to start another cycle. Each loading fixture emerging from the machine pushes the previous empty fixture onto the chain conveyor that runs alongside the machine. This conveyor carries the empty fixture back to the first operator while the machine is in operation.

All drilling, counterboring, reaming, chamfering and spotfacing operations are done dry. The only exception to dry machining is the tapping of the speedometer drive hole at station 15. Here a mist of oil, carried in a stream of compressed air, sprays on the tap after each operation.

To avoid broken drill and other obstruction dangers in the increment drilling of deep holes, a feeler type depth gage enters each hole and automatically retracts the head when an obstruction is present. In addition, the machine is automatically stopped by a limit switch. Signal lights on the master control panel identify the troubled station. The machine cannot be recycled until the defect has been corrected.

A special tool rack including a complete set of tool setting gages serves this and other machines in the production line (see Fig. 4). Two complete sets of tools are preset and placed in their proper positions in the tool rack. Color coding indicates whether the tool is to be used on the right or left hand side of the machine, or on the vertical head. Identification tags code the letter



FIG. 4—A special tool rack serves the machine illustrated in Fig. 3. Two complete sets of tools are preset and placed in position in the tool rack.

of the head with the number of the station in which the tool is used. The tags also key the tools to the holes in the transmission case. Where the tool is an assembly of adapters, nuts or other parts, the tool and part numbers of the subassemblies are also listed on the tag.

Rack Cuts Downtime

This tool rack eliminates downtime since it is not necessary to set or adjust tools while they are in the machine. It also permits a visual check of the number of sharpened tools on hand. Where the depth of hole is not critical, gage rods, such as the one seen in the center of the illustration, are used for setting drill and reamer lengths. Tools and tool fixtures being set are mounted in the hardened and ground steel tool setting fixture. Close tolerance tool setting, such as on counterboring tools, spotfacers, and other close tolerance machining tools are set on a flush-pin gage, see right of tool setting fixture. Fifteen of these gages for different depths are stored under the bench.

The transmission case coming from the Transfer-Matic is placed in a Cross four-way tapping machine that taps 29 holes, see Fig. 5. This machine has 31 spindles, 29 of which are in operation. It has one left and one right hand head, a vertical head, a head at the rear of the machine, and two angularly mounted heads. Each tapping spindle is equipped with: (1) an individual lead-screw feed, (2) its own cutting oil lubrication line, and (3) a safety feature that prevents

damage in case a tap should come in contact with an obstruction in the hole.

The cast-iron case is placed in the tapping machine, front end down, on guide rails. It is slid manually into place in the fixture and locked by hand clamps. The right and left hand tapping heads go into operation first. After these holes

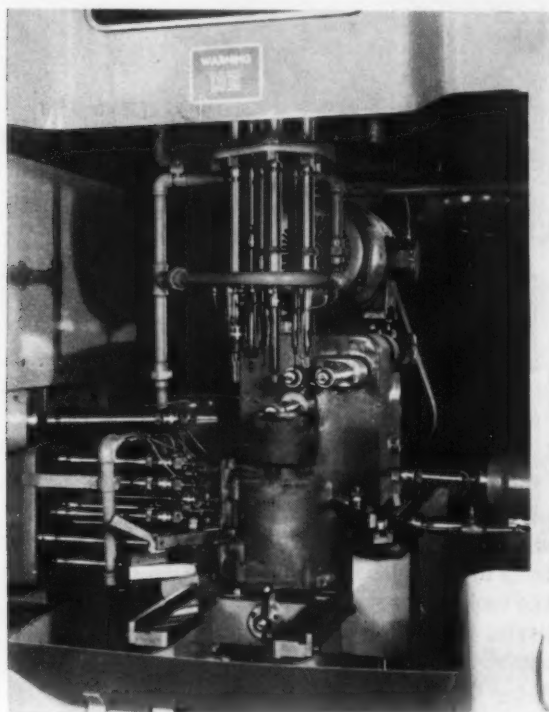


FIG. 5—This 31-spindle machine taps 29 holes in the transmission case. Each spindle has a safety device to prevent damage in case a tap hits an obstruction in the hole.

are tapped, the fixture is automatically elevated by an air cylinder to the second tapping position where top, rear and angular heads come into operation. After these operations are completed, the fixture automatically lowers for unloading and reloading.

Next, the angular holes in the servo face are drilled and six holes in the rear face are tapped in a Cross special drill machine equipped with 3-station multiheads. After this, the front face of the transmission case is lapped in a Crane 48-in. LapMaster. The case is then washed and

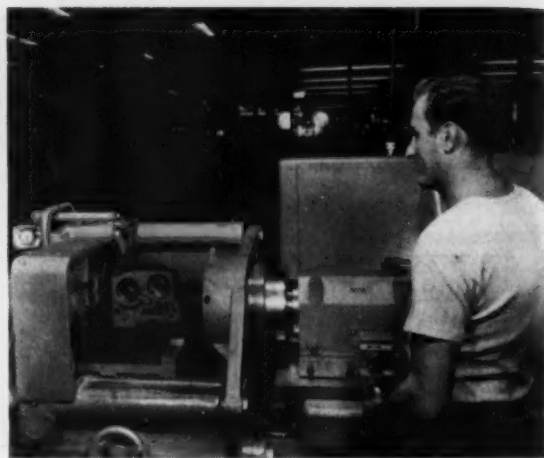


FIG. 6—A precision centerline boring operation is done on this Ex-Cell-O boring unit, producing four diameters and two faces. At this point the case and the bell housing have been mated.

brought to an Ex-Cell-O Jr. single-end boring machine where the parking lock bosses are finish bored. At final inspection, the following are checked: Porosity; diameters of parking lock pads; radius of valve body clearance; location of attachment holes; relation of surface to case; and concentricity of lock pads to bushing bores. Pin gages, surface gages, and thread gages are used to check ID's, OD's and linear dimensions.

After the bell housing and the transmission case are machined, the two castings are washed and then joined together for a precision centerline boring operation, see Fig. 6. The Ex-Cell-O precision boring machine produces four diameters and two faces. These diameters and faces must be held in close relation to the 14-in. diam and face, since they are used to couple the transmission to the engine. The left hand head determines the centerline used for checking. Its two diameters and one face must be concentric with the coupling diameter and face to within 0.005 in. total indicator reading. The right hand head bores two diameters and a face used to locate the planetary gear set and rear pump. Location dimensions must be held to within 0.003-in. indicator reading. The diameter tolerance on all of the above bores is 0.001 in. An additional operation consists of reaming two dowel holes in the rear face of the housing. The dowels are so placed that the snout of the valve body, when mounted on them, will be within 0.004-in. concentricity with the centerline, total indicator reading. After a thorough inspection of these limits, the two parts remain mated.

Extensive tooling and interesting setups on the valve body, torque converter and planet carrier will be described and illustrated in the second half of this two-part article, scheduled to appear in next week's issue.

Thin-section gray iron castings are susceptible to surface hardening effects that lower machinability. Use of silicon carbide cupola addition agents lessens chilling tendency and improves machinability. Tests show increases in tool life from 50 to 100 pct.

A Machinability Test for Treated Cast Iron



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CASTINGS are usually designed to require only light machining for finishing to dimensions. These finishing operations involve removing the as-cast surface plus a shallow cut into the underlying metal. Outer surfaces of castings usually have different structures and are less easily machined than the interior metal. If, for some reason or other, the part has been chilled, the hard as-cast surface will extend deeper into the underlying metal. This means that finishing operations will be removing more hardened metal for the same depth of cut. This impaired machinability results in shorter tool life.

Thin sectioned gray iron castings are particularly susceptible to this surface hardening effect for two reasons: (1) The microstructure of cast iron is highly sensitive to variations in rate of cooling; and (2) thin sections have low heat retention characteristics. For these reasons, thin-section parts such as automotive cylinder blocks are quite often difficult to machine.

If a method could be devised to lessen the

surface hardening effect on thin gray iron castings, parts could be more easily machined, and tool life extended. It was felt that a change in composition might lessen the sensitiveness of gray iron microstructure to variations in rate of cooling. The effect of Ferrocabo silicon carbide, a cupola addition agent, on the structure was studied.

Tests conducted by members of the Mellon Institute of Industrial Research on the use of Ferrocabo silicon carbide briquettes in place of ferrosilicon briquettes indicated that gray cast iron machinability could be improved. Results pointed to the fact that under certain conditions the surface hardening effect could be lessened and a more uniform structure achieved. An evaluation of the improvement in machinability through use of the Ferrocabo cupola addition agent was undertaken. This procedure included the setting up of: (1) A metallurgical control on foundry operations; (2) a suitable machining setup; and (3) instrumentation to gather test data.

The foundry phase of the experimental pro-

gram was carried out under a cooperative arrangement with a large automotive foundry producing an iron containing 3.35 to 3.50 pct total C, and 1.90 to 2.00 pct Si. Each 4000-lb charge consisted essentially of 30 pct pig iron, 30 pct steel and 40 pct scrap. In the treated charges, the 1 pct addition of Ferrocabo briquettes, in place of ferrosilicon briquettes resulted in a slight increase in the steel to pig ratio.

About 160 tons of iron per day were melted in a 60-in. cupola. The metal temperature at the spout was in the 2750° to 2800°F range. The complete program carried through 14 days of commercial operation. The ring specimens were poured from 1000 to 1200-lb ladles of base mixture iron with no ladle additions. The base mixtures were always within the desired analysis range as determined by the conventional chill test observations.

Test rings of 7-in. ID, 9-in. OD, and 1/2-in. thickness were made. They were individually cast in 18x14x3-in. cores in order to eliminate the variable effect of moisture on the surface structure of green sand castings. Silica sand of 65 grain fineness with 0 to 0.2 pct clay was used. Ingredients in the dry sand were 12 lb of oil and 18 lb of cereal per 1250 lb of sand. Test molds were gated in two places about 7 in. apart on the circumference of the ring, and two gates feeding the mold in opposite directions. The ring was cast in the drag, the cope merely providing the bridge for feeding the two gates. Each ring was assigned a number.

Before the machining tests were made, the rings were separated into approximately equal groups. One group contained a low carbon equivalent of 4.00 to 4.12 pct. The other group contained a high carbon equivalent of 4.12 to 4.20 pct. This breakdown permitted the determination of the effect of the carbon equivalent, within the melt analysis range of 4.00 to 4.20 pct, on machinability. The carbon equivalent is the sum of the total carbon and one-third of the silicon content of the iron.

The machining phase of the program was conducted in a large industrial laboratory experienced in making similar tests. A 14-in. engine lathe was used for the tests, see Fig. 1. To solve the chucking problem a special chuck was made that clamped the rings around their entire periphery. The special chuck was carried in a three-jaw chuck attached to the spindle of the lathe. The electrical tool dynamometer used for measuring tool forces was mounted on the tool post. The power supply to the tool dynamometer and the meters for reading the forces are on the table to the left

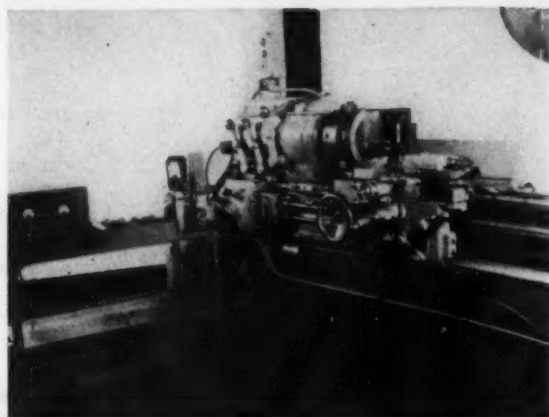


FIG. 1—Machinability tests were made on the gray cast iron rings in a 14-in. engine lathe equipped with a peripheral chuck.

of the lathe. The calibrated microscope for measuring tool wear was also on the table.

Fig. 2 shows a close-up of the tool-work apparatus. The carbide tool was mounted in the cantilever-type electric tool dynamometer. A test ring was clamped in the chuck, and a 1/16-in. depth of cut was taken across the face of the ring to determine tool wear across the cast surface. A shim and a stop on the tool carriage was used to obtain the depth of cut on successive rings. Cutting tools used were single point, tipped tools of Grade 44A Carboloy whose shape is described in Table 1. The 30°x0.025-in. chamfer on the nose was the form found best in practice tests.

Tool life was determined by measuring the wear on the flank of the cutting tool with a 100-power microscope. This wear was expressed in terms of the volume of metal that could be removed before the wear land reached a width of 0.005 in. The width of the wear land on the flank below the main cutting edge was measured at a distance of 0.0005 in. from the corner formed by the intersection of the cutting edge on the chamfer and the main cutting edge, as illustrated in Fig. 3.

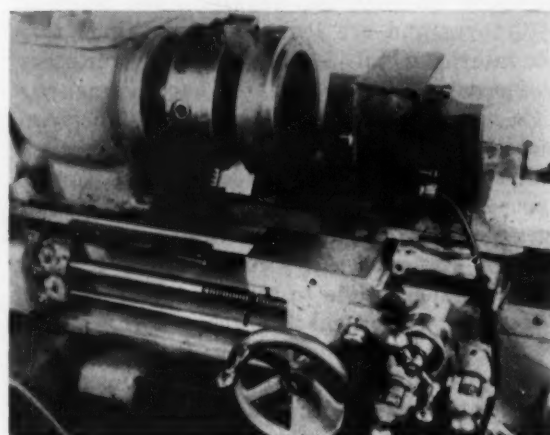
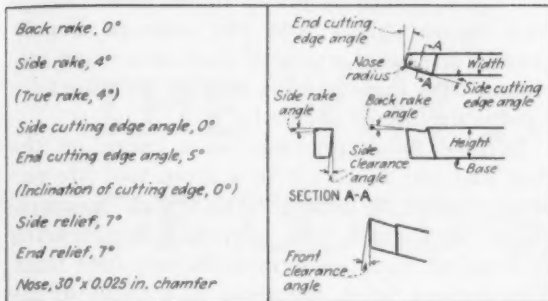


FIG. 2—Gray iron test rings mounted in a special peripheral chuck are carried in a standard 3-jaw chuck. Carbide tool mounted in tool post dynamometer makes test cuts across casting face.

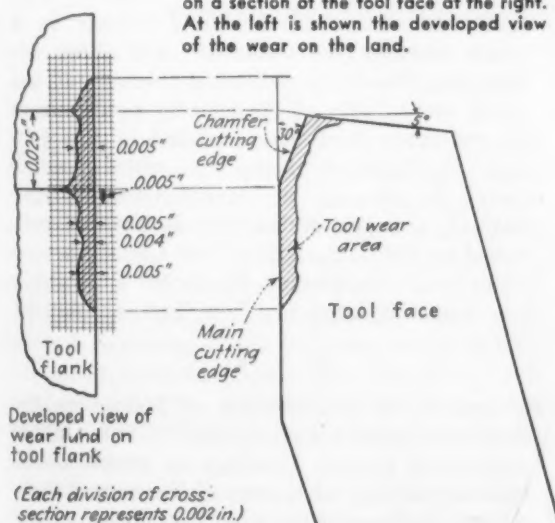
TOOL SHAPE USED



Tests stopped at this width of wear land have been shown to correlate well with those run to a full 0.030-in. wear land, which represents complete failure for carbide tools. Stopping at this point meant tool life data could be obtained from tests on a much smaller quantity of metal than would be required for full tool wear. It also meant that the effect of the cast surface of machinability of cast iron could be determined readily.

Tests were run at three different speeds to obtain cutting speed v. tool life data. The mean cutting speeds were 157, 210, and 314 sfpm. They were calculated from the mean 8-in. diam of the test rings. Cuts were taken alternately on cope and drag faces of test rings. No test ring was machined on both faces in the same test. This served to average out any individual differences between test rings and faces.

FIG. 3—Typical tool wear area is shown on a section of the tool face at the right. At the left is shown the developed view of the wear on the land.



Cutting speed v. tool life data when plotted on double logarithmic paper should produce a straight line. The tool life data obtained in the present tests are plotted in this manner in Fig. 4. For the sake of comparison, a plot on a linear scale is also given in Fig. 5. The linear function gives a truer insight into the nature of the cutting speed v. tool life relationship for any given material.

The horizontal distance between tool life lines for two different materials on the linear graph is a measure of the numerical difference in the tool life values obtained with these two materials. On the log-log plot, the horizontal distance between tool life lines is a measure of the percentage improvement in the tool life.

An examination of the tool life relation in Fig. 4 shows that the Ferrocabo treated iron of high carbon equivalent gave considerably better tool life than any of the other three classes of $\frac{1}{2}$ -in. thick test specimens. This was particularly true at the higher cutting speeds, where the high carbon equivalent Ferrocabo iron showed a considerable percentage improvement over the other irons tested. The range

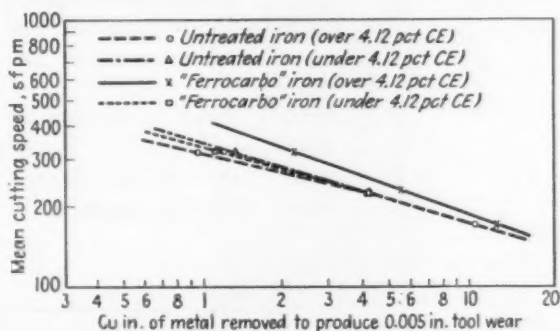


FIG. 4—Horizontal distance between tool life lines on log-log plot is a measure of percentage improvement in tool life. Graph is a plot of cutting speed v. total volume of metal removed between cuts for 0.005 in. uniform wear.

from 200 to 300 sfpm is the usual range of cutting speeds in which cast iron is machined with carbide tools. Over this range, the high carbon equivalent Ferrocabo treated iron gave a tool life from 50 to 100 pct greater than the average tool life obtained with other irons tested. The Ferrocabo iron of low carbon equivalent gave somewhat variable results.

The tool force components measured in these tests were the tangential force component, or

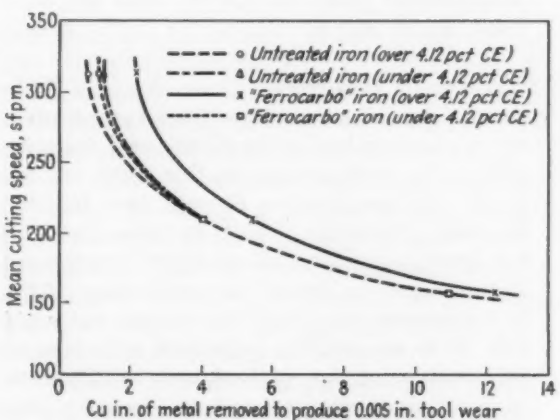


FIG. 5—Horizontal distance between tool life lines on linear plot is a measurement of the numerical difference in tool life values. Graph is a plot of cutting speed v. total volume of metal removed between cuts for 0.005 in. uniform wear.

cutting force F_c , and the radial component, or thrust force F_t . The average values of these tool force components in the present series of tests were $F_c = 170$ lb, and $F_t = 90$ lb. The average specific power consumption for machining these irons was found to be 0.68 hp per cu in. per min. Value of the cutting force and the mean value of the chip cross-sectional area, $1/16 \times 0.101$ in., can be calculated. This is found from the equation:

$$P = \frac{F_c}{396,000 A_o}$$

where P = specific power consumption—horsepower required per cu in. of metal removed per min.

F_c = cutting force or tangential force in lb.

A_o = chip cross-sectional area—depth \times feed in sq in.

The resulting figure for specific power consumption is

$$P = 0.68 \text{ hp per cu in. per min.}$$

This figure agrees with the average usually found for a good grade of cast iron when machined with carbide tools making no allowance for the dulling of the tool.

Surface finish readings were taken on the first and last faces cut in a given tool life run at each cutting speed. The finish measurements were made with a profilometer, tracing in a radial direction across the tool feed lines. The surface finish remained at a value of approximately 150 micro inch. It was unaffected by the nature of the iron, the cutting speed at which the rings were machined, or the wear of the tool over the ranges tested.

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New Books

"Aluminum and Magnesium Design and Fabrication," by R. B. Schulze. A practical approach to light metal product design and fabrication. Contains data on aluminum and magnesium, the processing of these materials, manufacturing methods and costs. Particular attention paid to machining, welded and bonded fastenings, and to finishing. Data is arranged in tabular and graphical form and is based on results of recent light metals research. McGraw-Hill Book Co., 330 W. 42nd St., New York. \$7.50. 582 p.

* * *

"Titanium, Its Occurrence, Chemistry, and Technology," by Jelks Barksdale. Widespread interest in titanium has increased the need for comprehensive working text on this light, strong, tough and noncorrosive element that has the desirable properties of both stainless steel and the strong aluminum alloys which recommend it for numerous industrial applications. This is the purpose for which the volume was written. It is an orderly, systematic collection of information on the various uses of titanium, in addition to data on mineral deposits, production and importation of titanium ores and the chemistry of the element, its oxides and salts. Ronald Press Co., 15 E. 26th St., New York 10. \$10.00. 486 p.

"Electronic Engineering Master Index." This 1947-1948 edition is the third volume in a series covering the electronic and allied engineering literature published throughout the world since 1925. Two entirely new sources for reference have been included in this edition, the 5500 electronic and allied patents issued by the U. S. Patent Office during 1947-48, and the declassified documents published by the U. S., British and Canadian governments. Electronics Research Publishing Co., Inc., 480 Canal St., New York 13. \$19.50. 339 p.

* * *

"Symposium on Deformation of Metals as Related to Forming and Service." This ASTM symposium focuses attention on recent developments dealing with some of the more fundamental studies of plastic deformation and flow. The five technical papers presented cover tests of ductility in ship structure, notch sensitivity of ship plate and correlation of laboratory-scale tests with large-scale plate tests, measurement of ductility in sheet metals, hydraulic bulge testing of sheet metals, and notched bar tension tests on annealed carbon specimens of various sizes and contours. American Society for Testing Materials, 1916 Race St., Philadelphia. \$2.00. 126 p.

THE WHY AND HOW OF COLD HARDNESS MEASUREMENT

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Despite the need for engineering data on hardness of materials at low temperatures, available information is meagre and inconsistent. To get more accurate test results, standard testing equipment has been equipped with special auxiliaries.

MUCH modern equipment, especially in the transportation field, is expected to operate satisfactorily at temperatures as low as 60° to 70°F below zero. Though a design engineer would hardly ignore some sort of hardness specification for materials for parts to operate at ordinary or elevated temperatures, very little data are available on the property of hardness as correlated with functional expectancies at such low temperatures. Metallurgical literature, for example, contains only six published reports on cold hardness.

Just over 40 years ago, R. A. Hadfield¹ of Great Britain and M. F. Robin² of France used the then novel Brinell machine for testing several metals and alloys at room and liquid air temperatures. The conspicuous increase in Brinell hardness at about -328°F must have startled the technologists of that period, but no additional work was done until the advent of the modern airplane and the latest type of rolling stock on America's railroads. The timely paper by H. W. Russell,³ in 1931, presented during the classic ASTM Symposium on Effect of Temperature on the

Properties of Metals again called attention to the increase in Brinell hardness in a range from 70°F to -112°F for such important metals as 3.5 pct nickel steel, 18-8 stainless, and Monel.

In 1939, A. Pomp⁴ of Germany repeated the experiments with liquid air but with alloy steels as used especially in aircraft. Pomp conducted his tests with the fractured pieces from previously broken Charpy impact specimens. The limited cross-section of the test pieces (0.396 in. x 0.396 in.) made it necessary to determine Brinell hardness with a 5 mm steel ball, 750 kg pressure at 30 sec loading period. The latest and probably the most exhaustive of all these studies was the one by Samuel J. Rosenberg⁵ of the National Bureau of Standards, who has investigated the Rockwell hardness of many aircraft metals at various sub-zero temperatures down to -108°F.

Repetition of tests outlined by the above investigators followed by critical analyses of the inconsistencies observed indicated that better agreement could be expected if the coolants were agitated or if the specimens under test were slowly moved in the solution. Mixtures of chipped

ice and sodium chloride, or ice and calcium chloride and dry ice in ethyl alcohol are subject to much undercooling and variations of temperature due to inability to maintain a uniform mixture of the ingredients.

The author has equipped a standard Brinell machine—previously calibrated against a Bureau of Standards proving ring—with a heavily insulated stainless steel chamber (4 in. ID and 2¼ in. high) which could be filled by gravity from an equally insulated stainless steel container (3 in. ID and 6 in. high) through a small tube, the flow of the coolant being controlled by a valve. This container is filled with acetone, subsequently cooled with a specified amount of dry ice. The latter rests on a perforated false bottom which can be moved up and down, thus slowly and uniformly cooling the acetone. Temperatures are checked by a toluol-filled thermometer.

After the desired range is reached the specimen is placed into the refrigerating chamber on the elevating screw of the machine. A rapid, controllable and uniform heat transfer from sample to coolant is thus accomplished. A temperature check is made of the coolant in the chamber, the fluid overflowing into a measuring glass cylinder. For very accurate determinations, a uniform rate of flow may be maintained by merely regulating the valve to obtain such uniformity. All specimens used in this work were alike in dimensions and measured 2x1½ in. The Brinell test cycle was also standardized at 3000 or 500 kg, 30 sec at load and a 10 mm diam tungsten carbide ball.

Apparatus Attachments

The auxiliary apparatus shown in Fig. 1 is readily adapted to cold hardness tests by means of the Rockwell hardness tester. For such an application the specimen chamber should be mounted on the 8 in. platen of the Rockwell to which a cylindrical extension (of the same OD as the elevating screw of the Brinell tester) has been attached. In addition, a 2¾-in.-long special adapter for the indenters used is required for making the tests under the coolant level. Stainless steel should be used for this adapter.

The above apparatus could be used in conjunction with testing devices such as the Vickers machine. Measurement of the diagonals of the indentations obtained may be conveniently made after conclusion of all tests and after removal of the specimen from the coolant.

Plastics, aluminum and magnesium alloys, as well as other metals in the low hardness range may readily be tested for cold hardness by the portable Barcol hardness tester. The equipment required—in addition to the tester—is a low form Pyrex beaker of 400 to 600 ml capacity set in a sawdust-filled box for insulation, a toluol-

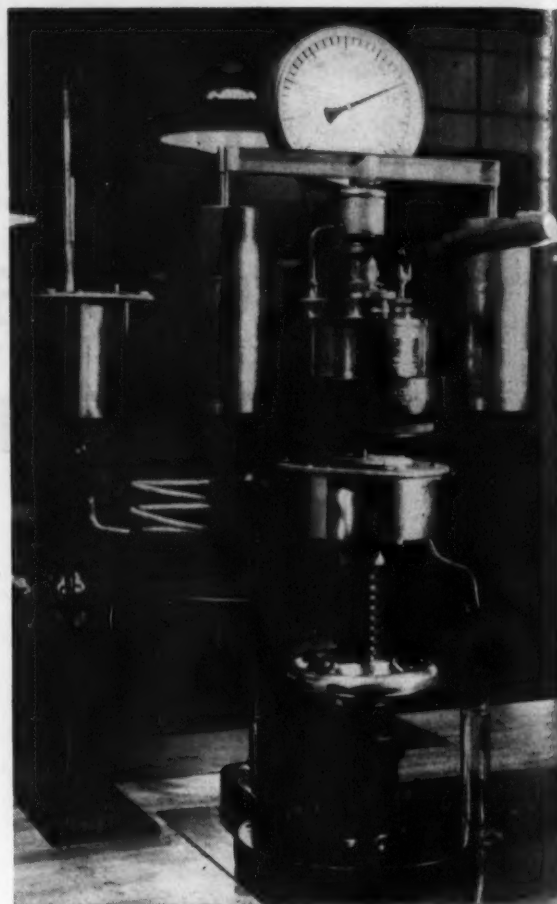


FIG. 1—Brinell hardness testing machine equipped with cold hardness attachments.

filled thermometer reading to at least -120°F , laboratory tongs, acetone and dry ice. Again the 2x1½ in. samples of the materials tested will be found ideal for such work.

The specimens are submerged in the acetone, filling about a half of the beaker. The fluid is cooled to the desired temperature by careful additions of dry ice. The samples are held for 30 min at temperature, removed quickly and may be tested within less than 2 sec with the direct reading Barcol. Several readings may thus be taken in just a few seconds. As a precautionary measure the cooling mixture should be stirred very frequently as otherwise temperature variations as high as 18°F may be observed around the specimen.

Rubber, Neoprene and similar compounds are known to harden abnormally upon exposure to subzero temperatures. In order to measure this increase in hardness the standardized Durometer test may be applied, but since the extent of the hardening depends markedly upon the time of exposure and mechanical preparation of the sample under scrutiny the conditions prior to the test must be carefully observed and suitably recorded. In order to facilitate such investigations of hardness at low temperatures, the DuPont Rubber Laboratories have designed and used a Durometer test stand for use in a cold

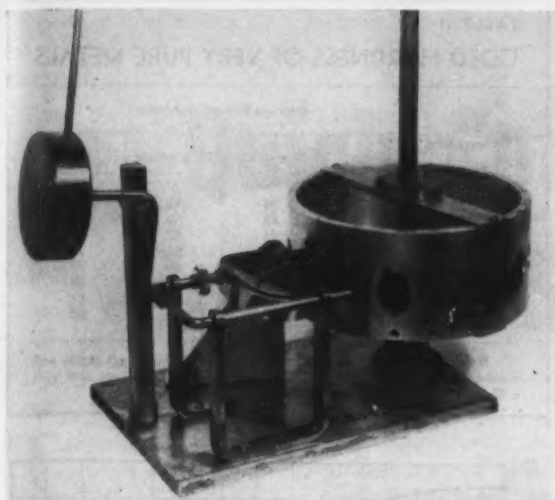


FIG. 2—Durometer hardness test stand for measuring cold hardness of rubber-like materials.

box. This apparatus is designed around a Type A meter and enables convenient testing of samples in a drum which may be rotated around a vertical axis. In a later model, this drum also travels a trifle vertically as it is rotated, thus no two Durometer impressions are ever taken in the same spot of the sample. Fig. 2 shows the general arrangement of the original test stand.

Frictional and abrasion hardness are perhaps best evaluated on the basis of scratch hardness. The author's automatic sclerometer has been utilized for some preliminary work in this direction. The apparatus, shown in Fig. 3, is equipped with a 136° diamond pyramid as a scratching point and permits a wide variation of controllable speeds by means of a Variac-controlled elec-

tric motor drive. A small insulated stainless steel box (not shown in Fig. 3) has been installed on the movable platen. The temperature in the box may be checked by a built-in platinum, platinum-rhodium thermocouple, its readings being taken from the micro-ammeter on the control board of the sclerometer. Microscopic measurement of the width of the scratches produced under known subzero temperatures conclude the experimental phase of such scratch hardness tests.

Rosenberg, Russell, Robin and Hadfield agree that indentation hardness of metals and alloys increases with decreasing temperatures. Excerpts from their tests are shown in Table I. This trend was also confirmed by the present tests with standardized specimens of high purity elementary metals. Scratch hardness tests disclosed a measurable narrowing of the average width of scratch as the temperatures of the sam-

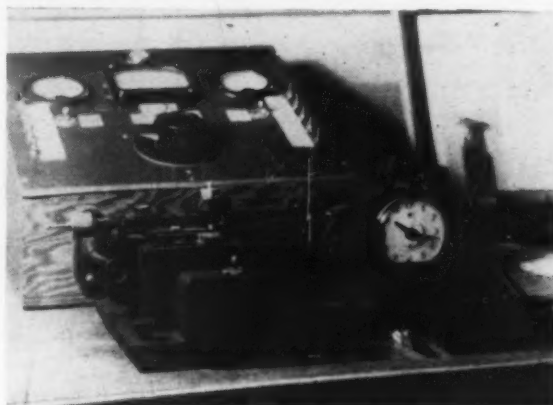


FIG. 3—Sclerometer used for low temperature hardness tests.

TABLE I

COLD HARDNESS TESTS ON METALS

Material	Brinell Hardness				Investigator
	68°F	-4°F	-112°F	-298°F	
Aluminum.....	86			80	Hadfield
Copper.....	77			90	Hadfield
99.90 pct Cu.....	73	76	78		Robin
99.96 pct Cu.....	84			105	Pomp
Iron.....	121			259	Pomp
0.01 pct C.....	90			260	Hadfield
0.02 pct C.....	110	107	114	273	Guillet
Steel.....	176	174	190	286	Guillet
0.33 pct C.....	230	230	231	330	Guillet
Cast Iron.....	151			199	Russell
Monel.....	208	218	227		Rosenberg
Nickel.....	100			150	Hadfield
pure.....	121			159	Pomp
99.0 pct Ni.....	98	103		120	Guillet
Steel.....	197	212		240	Guillet
57.4 pct Ni.....	158	168	288		Russell
3.5 pct Ni.....					
Stainless.....	144	171	192		Russell
18-8 annealed.....	137	151	171		Rosenberg

Note: Reported tests by L. Guillet conducted with 10 mm steel ball, 10 sec at 1000 kg on Fremont machine. S. J. Rosenberg's values obtained by conversion from Rockwell numerals.

ples decreased, thus proving the above mentioned relationship.

Several plastics have been checked for cold-hardness by the Barcol apparatus. Again the hardnesses were invariably higher at subzero temperatures than at ordinary room conditions.

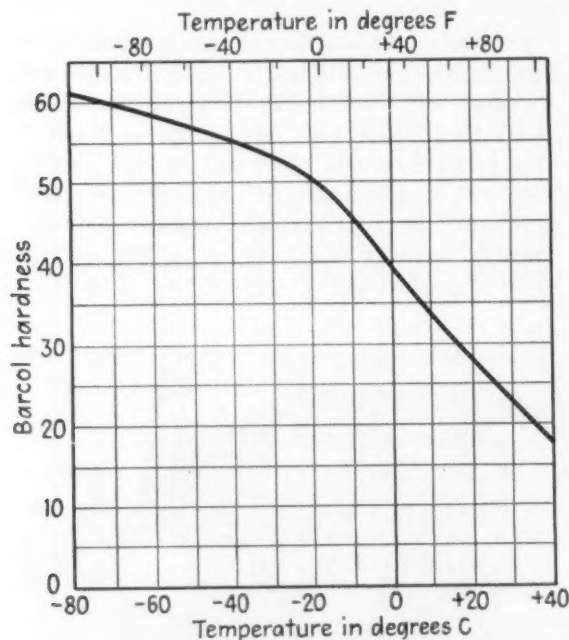


FIG. 4—Hardness of Lucite at low temperatures.

Freeze resistance of resilient materials like rubber or Neoprene has received much more attention from industrial laboratories than that of metals and alloys. Fig. 5 summarizes tests made by DuPont technologists with rubber and two types of Neoprene. As a result of these and similar tests a freeze-resistant type of Neoprene has been developed which is elastic down to at least -40°F . This is naturally an important application of the cold hardness test, since many automotive vehicles are expected to operate at low temperatures and have parts which must retain their flexibility.

Although many engineers are familiar with the general relationships of temperatures with

TABLE II

COLD HARDNESS OF VERY PURE METALS

Test Temperature, °F	Average Brinell Hardness			
	Copper	Aluminum	Magnesium	Iron
75	42	39	53	70
50	44	40	55	70
25	47	43	57	72
0	49	43	59	74
-25	51	44	59	75
-50	52	44	60	80
-75	54	46	61	82
-100	57	48	64	88

Note: All metals used in above tests were over 99.9 pct purity and dead-soft. The actual tests were made at 500 kg load, 30 sec and with a 10 mm tungsten carbide ball.

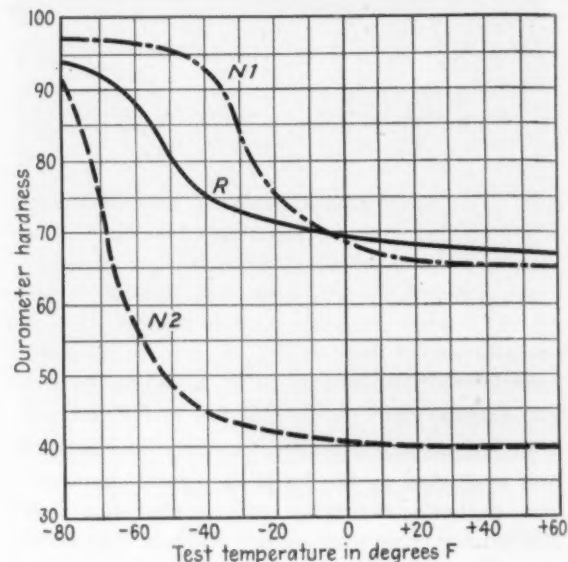


FIG. 5—Hardness at low temperatures of rubber (R) and two types of Neoprene (N1 and N2).

some of the critical properties of metals, plastics and rubberlike materials, test data pertaining to the cold hardness and resilience of many industrially used materials are still a much felt omission in technical handbooks and published data sheets. In addition, perhaps some deliberation and fundamental research may yet be in order as to the basic reasons for the experimentally established fact, that all metallic and non-metallic matter so far investigated has shown a readily measurable trend to increase its hardness as the test temperature is decreased.

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- ⁶ S. J. Rosenberg, "Effect of Low Temperatures on the Properties of Aircraft Metals," *U. S. Bureau of Standards Research Paper RP 1347*, December 1940.

Quick Counterattack Urged by Steel Leaders

THE steel industry is getting ready to launch a huge counter attack against those who would destroy personal freedom and free enterprise through "creeping strangulation of government interference and control." This was the most significant and most often repeated theme running through the 58th General Meeting of American Iron and Steel Institute held last week in New York.

Far in the vanguard was Hiland G. Batcheller, chairman, Allegheny Ludlum Steel Corp. Mr. Batcheller's voice was quiet, but his words were those of a fighter. He urged his fellow members to drop their gentlemanly, pacifist attitude and start slugging. He said the greatest danger is not from an attack from the stronghold of communism, but from within. This attack has been both direct and oblique—accompanied by pledges of devotion to free enterprise. "Every politician and headline hunting theorist knows how cumbersome we are in our public relations. Each of them has been well aware that he could attack us and by the time we got around to defending ourselves—if we ever did—it would be too late to adequately refute the charge or do us any good."

Cites Felonious Assault

Mr. Batcheller said that is what has been happening in the steel industry for a long time. "We have been feloniously assaulted on page one and replied 3 days later on page 23 — or 3 months later in the financial section. And no matter how good our case may be, we can't win by fighting front page attacks on page 23."

Walter S. Tower, president of AISI, warned that "the efficiency of the industry . . . can be impaired or destroyed unless essential changes alter the direction of official thinking and public attitude."

He compared the steel industry of 50 years ago with that of today. Then he pointed out that "for more than 30 years the industry had continued to enjoy practical freedom from widespread labor troubles and interferences from government." Then all energy could be directed toward solving internal problems. But lately the industry has had to face other problems arising from outside its operations.

"Persistent encroachment on the rights and



SPEAKER: Harold E. Stassen, left, who gave the dinner address, chats with John W. Davis, attorney for the institute. Both have aspired to the presidency of the United States.

responsibilities of private management in the steel industry leaves too little margin between the present position of the industry and a declared intent to nationalize."

Dr. R. E. Zimmerman, vice-president, research and technology, U. S. Steel Corp., declared that there is economic strength in the partnership of applied research and industrial progress. Mr. Zimmerman said Mr. Tower had asked him to make his speech philosophical rather than technical, but that that was like trying to sell a tonnage of off-grade brown ore to Charley White. Then, in non-technical terms, he proceeded to identify the role of research in industrial progress.

On Research Agenda

He listed the following as unfinished business on the agenda of research: (1) The battle against corrosion, (2) control of sulphur from metallurgical coal, (3) beneficiation of lean iron ores, (4) use of oxygen in smelting and refining, (5) use of the atom, (6) hot extrusion, (7) direct casting and (8) gaseous reduction (sponge iron).

Dr. Edward R. Weidlein, director, Mellon Institute, delivered the fourth annual Charles M. Schwab Memorial Lecture. He said that "the iron and steel industry, developed into a strong

technical position by wide research, must be kept free from regulations which would prevent expenditures for long range planning."

Harry Moses, president, H. C. Frick Coke Co. told the AISI members that the best result obtained from the present coal contract with the United Mine Workers is that "we can look forward to 2 years of peace." He urged that this time of peace be employed by every segment of the industry in an all out effort to meet the challenge of these changing times. Asserting that the coal industry is not sick, he said it can continue to be a model of free enterprise.

Action Needed on Materials Handling

Harold E. Stassen, president, University of Pennsylvania, told the institute members at the closing session that "freedom is precious." He declared that "the economic freedom of man . . . cannot permanently be divided from his other freedoms." He said that a man cannot turn over part of his freedom to government and keep the rest. He will either win all or lose all freedom.

W. G. Nichol, manager, methods engineering bureau, and W. N. Flanagan, fuel and furnace engineer, Carnegie-Illinois Steel Corp., gave an outstanding paper on "Materials Handling in the Steel Industry." Pointing out that from 60 to 90 pct of the man hours involved in steelmaking are related to materials handling in some way they held that the subject had to be reviewed. It does not necessarily mean the addition of new equipment, they asserted, for much can be done by making more efficient use of existing facilities.

Spectrograph Speeds Electric Furnace Heats

In a paper delivered by E. O. Waltz, chief chemist, Canton Steel Div. of Republic Steel Corp., the use of the spectrograph in the steel industry was brought up to date. Mr. Waltz said the spectrographic method for determining chemical analyses will never entirely supplant wet chemical methods. The spectrograph is an aid rather than a substitute for wet chemistry.

Since quick chemical checks in the melting and refining of steel are now possible the spectrograph is used in many modern melting shops. Increasing contamination of tramp alloys in scrap, the substitution of low grade materials for economic and other reasons, has made the instrument a necessity in many shops. The alloy and residual elements of a heat of plain carbon or alloy steel can be determined within 10 to 15 min from the time the sample is received in the laboratory, and according to Republic's experience, with the expenditure of 1.9 man-hr of work. This is based on an analytical check for manganese, silicon, nickel,

chromium, molybdenum, copper and tin. Carbon, sulfur and phosphorous are obtained by wet chemical methods. To obtain all these results entirely by wet chemical methods would require an expenditure of at least 2.9 man-hr of work and a properly staffed and equipped laboratory which would take approximately 30 min to do the same thing that one spectrograph unit and operator can do.

Use of the spectrograph in electric furnace melting shops has permitted more heats per day. After the slag-off or oxidizing period, the furnace crew must wait until the laboratory results are returned before calculating the alloy addition. The spectrograph on the average saves 10 min of waiting time at this point of each heat. Later a test is taken just prior to tapping a heat to allow final adjustment of alloy content and here another 10 min saving is realized. On an estimated cost of \$1.00 per min of furnace time, this results in a saving of \$20.00 a heat and if the furnace were making three heats a day the saving would accumulate to over \$21,000 per year per furnace.

Reports on Electron Microscope

Alfred L. Ellis, manufacturing research division, International Harvester Co., gave an interesting paper on some of the applications of the electron microscope used on ferrous materials. There has been considerable controversy concerning the best types of material for replicas as the electron microscope is not focused on the sample but on a replica made from the original sample. The techniques in making these replicas vary with each and every laboratory but essentially they must be reliable techniques and reliable materials in order to reproduce consistently the impression of the structure being studied.

Mr. Ellis reported on the reliability of plastic replicas from a study made at International Harvester comparing the same carbide particles of steel with the light and electron microscope. In a study on type 52100 bearing steel the electron microscope has proved what everyone has known for a long time, that there were large numbers of carbides present in the structure that no one could see under the light microscope. In certain samples investigated at Harvester, almost 75 pct of the particles were smaller than 0.05 microns which the ordinary light microscope under the best polishing techniques in the world would miss. The replicas of these structures were viewed in 9000 diam and the replica material was formvar, chromium shadowed.

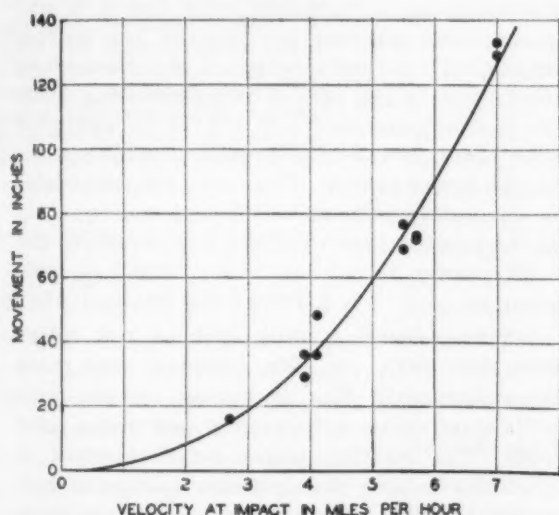
Outlines Packaging and Loading

A. H. Andrews, special engineer, Bethlehem Steel Co., gave a paper on the protection of steel in transit in which he covered the packaging and shipment of major products other



SLUGGERS: Some of the steel leaders who are trading blows with the industry's defamers. Left to right, Hiland G. Batcheller, chairman, Allegheny Ludlum Steel Corp., Benjamin F. Fairless, U. S. Steel president, Walter S. Tower, president of the institute, and Dr. R. E. Zimmerman, U. S. Steel research vice-president.

than tinplate. The loading of trucks and freight cars of all types, including water borne shipments, were discussed. Mr. Andrews even got down to the fine points of the tie-down devices used in ships to hold steel cargo in place so that it is not damaged in transit. He outlined the method of arranging floating loads on open gondola cars for rail movement.



LOAD TESTS: It has been found that heavier packages withstand transportation hazards better than light ones. This curve shows the relationship between velocity and movement of 18,000-lb sheet packs.

Damage in transit has become a complex science. Mr. Andrews showed in his talk a table entitled "Movement of Shipping Units Subjected to Bump Tests in Inches." This was broken down in products such as sucker rods, tinplate, large diameter pipe and sheets. Shippers have studied the affect of speed of impact on steel products in shipment and can come up with some tables showing what damage may be expected. With such information they have been better able to prepare the steel for shipment so that it arrives at the customer's plant in the best possible shape. Details on packaging and loading of steel products are

becoming an increasingly larger part of the AISI product manuals which are printed to cover each and every specific steel product.

How Weirton Packs Tinplate

The steel industry is different than many in that the packaging of steel products is not done for eye appeal and advertising purposes. The industry does not find that reusable packages are advantageous and often they are impossible. Packaging in the steel industry is for utility and protection, said D. H. Dellinger, head of the service inspection division of Weirton Steel Co., Weirton, W. Va., in reporting on their latest practice in regard to tinplate.

The many different packaging specifications and the growing tendency on the part of customers to divert shipments has meant that the mills have had to review packaging methods and materials. This review started about 5 years ago.

Mr. Dellinger reported on the packaging methods for tinplate as it is a particularly good example of what the industry faces. Tinplate is sold as base box, 31,360 sq in. or normally 112 sheets of tinplate. When a mill ships tinplate it is never sure where it is going to finally be used.

Use of Electronics Increases

Some of the results of Weirton's long study on this problem are as follows: (1) Water repellent paper will not prevent loss due to severe sweating; (2) sealing of paper linings at the platform can best be accomplished by full length angles laid along the bottom of the wooden platform skids; (3) all corner angles must be cushioned to prevent tearing of the paper lining; (4) a metal wrapper and a metal container are not enough to prevent loss from sweating without a very large overlap of the joints or use of waterproof paper lining; (5) newly developed rust inhibitors will not prevent loss due to severe sweating in a pile of sheets; and (6) under severe sweating conditions, water forms on the outside of the package and pene-

trates the wrapping or lining if it is not waterproof.

One session of the general meeting of the AISI in New York was devoted to the use of electronics in the steel industry. W. R. Harris, manager, metalworking section, Westinghouse Electric Corp., delivered a paper on the use of electronics for steel mill drives. He listed specific applications of main and auxiliary drives. Some uses include low maintenance ignitron rectifiers for converting ac to dc, precise speed regulating systems for rod mills and flying shears, better air cleaning through electrostatic dust precipitation, tin reflow by high frequency induction heating, and photoelectric scanning devices for tin reflow control and loop regulating systems. Advantages of ignitron rectifiers in the steel industry compared to motor generator sets were given. Mr. Harris declared that ignitron rectifiers had these advantages over MG sets: (1) higher efficiency, particularly at light loads; (2) quiet operation; (3) elimination of heavy foundations and ventilation; (4) high momentary overload capacity; and (5) lower maintenance cost.

A recent and exciting use of radio frequency heating is for reflow of tin on electrolytic tinning lines. Mr. Harris said that a total of 9800 kw of radio frequency generators have been supplied for this application. This is more than twice the kw employed in all radio broadcasting stations in the country. The tinplate produced in electrolytic lines has a gray matte surface. When the tin is heated to the flow point the strip surface changes from a matte to a bright shiny surface and results in a coating which has minimum porosity, maximum corrosion resistance and a better bond. Equipment for reflowing tin can be used on high speed tinning lines when the strip is running at approximately 1000 fpm and requires 1200 kw of high frequency electronic generating equipment.

Describes Steel Mill Electronics

L. A. Umanski, assistant manager, industrial engineering division, General Electrical Co., Schenectady, spoke on the future of power electronics in the steel industry. He summed up experience and application to date on electronics in steel mills and then went on to appraise the future trend.

Mr. Umanski told the group that the average conversion losses on a 7000-kw rectifier are some 300 kw lower than an equivalent motor generator installation. Should the installation operate for 7000 hr a year the resulting power saving would be over 2 million kwh or about



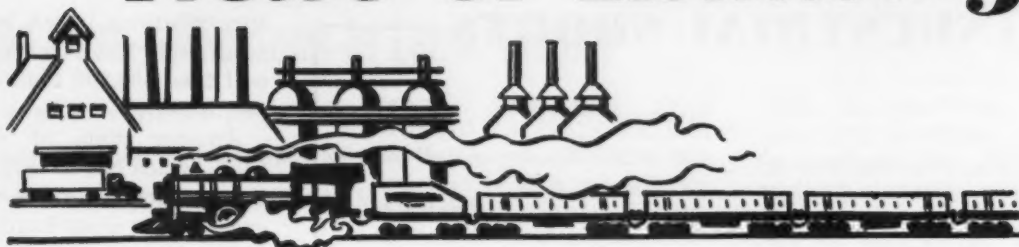
MEDALIST: Donald E. Babcock, left, a Republic Steel metallurgical engineer, was awarded the American Iron & Steel Institute Medal for his 1949 paper on "Sulfur Control and Manganese Conservation in Openhearth Furnaces." In the center is Dr. Edward R. Weidlein, director of Mellon Institute, who gave the Schwab Memorial Lecture. With them is Walter S. Tower.

\$14,000 a year. Mr. Umanski also said that there are some engineering and operating factors which definitely limit the application of rectifiers to main roll drives. They are not readily suitable for reversing drives as needed on blooming, slabbing, plate and other mills of this type. Rectifiers can be made to operate under the conditions of reversing drive but it is still questionable whether this practice can be recommended now and whether it will be used in the future. In the case of large reversing mills the motor generator sets are often equipped with heavy flywheels to equalize the load peaks on the power system. This, the group was told, is impossible with rectifiers and consequently at the present time rectifiers and reversing hot mills cannot be considered an attractive combination.

On non-reversing mills such as rod, billet, tube, hot strip, etc., Mr. Umanski was much more optimistic. The dc motors driving such mills start rather infrequently and under light loads. The rectifier phase retard method of gradually raising the dc motor voltage is well suited for this purpose. The operating speed range of the mills is covered by motor field control which means that rectifiers are usually operated at a normal voltage with very little phase control. When a portion of the steel mill speed range is to be covered by a motor voltage control rectifiers can still be used but at some sacrifice.

Non-reversing hot mills constitute the most logical and promising field for rectifiers and may well find larger use in the future. Tandem cold strip mills accelerate from threading to running speed and then decelerate again, often for each coil and often every few minutes. This acceleration is done under peak load conditions; deceleration is rapid, with the motors pumping back into the generators. In these cases the rectifier application is not very attractive.

News of Industry



High hp Banana Train

Schenectady—Four of the six 120-ton, 1200-hp, narrow-gage diesel-electric locomotives ordered by the Compania Agricola de Guatemala will be used as a team to haul banana trains up the steep grades from the Pacific coast to Guatemala City. Most powerful 36-in. gage diesel-electrics ever built by the General Electric Co., the locomotives will be used two at the head and two in the middle of the train. Dynamic braking enables two units to return empty trains down grades ranging up to 3.6 pct. Maximum permissible speed is 40 mph and the locomotives are designed for operation on curves having a radius of not less than 230 ft.

Sign New England Gas Contract

Boston—What is reportedly the world's largest single natural gas supply contract was signed with the United Gas Pipe Line Co., the seller, by the Texas Eastern Transmission Corp., the buyer.

Providing for the annual delivery of about 134 billion cu ft of gas, the contract brings closer, transmission of natural gas to New England by the Algonquin Gas Transmission Co., which will use Texas Eastern as a supplier.

Signing of the contract was announced last week.

Manganese Imports Decline

Washington — Manganese ore shipments to the United States in the first 3 months of 1950 were 391,886 short tons, substantially lower than in any period since the second quarter of 1949, reports the Bureau of Mines.

Scrap Shortage Again Haunts Steelmakers

Prices running wild . . . Steelmaking costs boosted . . . Low prices last year and unexpected tempo of steel demand blamed . . . Exports contributed too—By BILL LLOYD

Cleveland—With demand for steel pushing the melt to an all-time high, the steel industry this week is facing what may prove to be one of the longest, costliest and most severe scrap shortages in its history.

Prices are running wild in some of the major consuming points and last week, with the Youngstown market at \$39, it was reliably reported that valley consumers owed 250,000 tons at \$35 and under.

Background of this expensive and sudden dilemma lies in the tremendous and virtually unforeseen demand for steel which brought a number of other factors into sharp focus.

Role of Exports

Exports played an important role. Collapse of scrap prices last year signalled a resumption of scrap exports which rose to 307,468 gross tons, highest since 1941. At the same time, the steel industry was importing 977,154 gross tons, highest tonnage in history. An estimated 100,000 tons was exported during the first quarter of this year, according to reliable sources.

This could easily be the unhappy result of mills permitting the complete collapse of scrap prices last year. Some buyers simply assumed erroneously that the scrap market had finally reverted to its prewar status and they were back in the saddle again.

When the present pattern of steel demand became apparent in some quarters late last fall, the market began to stir and following a period of quiet, prices began to advance rapidly about 2 months ago.

Mills were trying to line up their requirements and more scrap was sold than had been bought and a terrific short interest developed.

Talk to a Swami

At the moment, what next week's prices will be is a job for the scrap buyer's favorite swami. But before the crimp develops in the present upward spiral, it is possible that No. 1 heavy melting steel will reach \$50 in some major consuming points, according to those in the know. Steel price increases of as much as \$5 a ton by some of the smaller mills are not unlikely.

Buy Foreign Scrap

But the big question is what the steel industry is going to do about it. This country is probably in worse shape for scrap now than it was on the eve of Pearl Harbor.

First move might be for the steel industry to request the Secretary of Commerce, Charles M. Sawyer, to halt issuance of scrap export licenses.

A second step, and one which some mills are quietly taking, is the importation of foreign scrap. One eastern mill is already picking up foreign tonnage a boatload at a

INDUSTRIAL SHORTS

BUYS CONTROL — REYNOLDS METALS CO., Richmond, Va., will purchase the controlling interest in Southern States Iron Roofing Co., Savannah, Ga., on June 30. Purchase price is reported to be around \$2 million. The company will continue to operate as a separate company under its present management.

IN BUSINESS — William P. Burke, formerly assistant manager of sales, sheet and strip division of Inland Steel Co., and Bernhard Gordon, president of Gordon Steel Co., have formed a new steel warehousing organization, the GORDON-BURKE STEEL CO. at 2910 Carroll Ave. in Chicago.

INCREASES CAPACITY — A 38,000 sq ft addition to its enameling plant is being constructed by GENERAL STEEL WARES, London, Ont. The expansion will cost the firm \$350,000.

EXPANDS LINE—The Moulded Metals Co., Inc., manufacturers of powdered metal products, has been acquired by the WATERTOWN MFG. CO., molders of plastic products. Both companies are located in Watertown, Conn.

GRAY BUYS — E. L. Gray, manager of the Dayton operation of Edgar T. Ward's Sons Div. has purchased this outlet as a private enterprise. Mr. Gray will continue the business at Dayton under the name of WARD STEEL SERVICE CO. with the same personnel.

NEW OUTLETS — Ampco Metal, Inc., Milwaukee, has appointed JAEGER WELDING SUPPLY, INC., Springfield, Mass. and TEXAS WELDING SUPPLY CO., Dallas, as distributors. Each will handle the complete line of various grades of Ampco-Trode, Sil-Trode and Phos-Trode electrodes.

CALL FOR BIDS — The SYRIAN MINISTRY OF PUBLIC WORKS has issued a call for bids for steel or cast iron piping for the new Aleppo water supply system. One set of bidding conditions and specifications is available on a loan basis from the Commercial Intelligence Branch, Dept. of Commerce, Washington.

ELECTS OFFICERS—Dr. Arthur B. Wilder, chief metallurgist, National Tube Co., has been named chairman of the Pittsburgh Chapter of the AMERICAN SOCIETY FOR METALS. Max W. Lightner, manager, research and development, Carnegie-Illinois Steel Corp., will be vice-chairman.

TAKES OVER—Frank J. Kennedy, recently resigned vice-president in charge of manufacturing for Briggs Mfg. Co., has taken over the ALL METALS PICKLING CORP. in Detroit, which is engaged in pickling steel, slitting, roller leveling, shearing and warehousing.

BUILDING—Construction of a new plant at 3200 27th Ave., N., Birmingham, has been started by SHERWOOD A. MOORE IRON WORKS. The new plant will turn out miscellaneous iron and steel products.

FORMS DIVISION — Northrop Aircraft, Inc., Los Angeles, has formed a new operating division, the DY-CHEK CO. The new unit will manufacture and distribute materials and supplies required for a new metal inspection method for cracks known as the Dy-Chek process.

AMERICAN AGENT — Safag, S.A., Bienne, Switzerland, manufacturers of high speed, high precision machinery, has appointed the HAUSER MACHINE TOOL CORP., Manhasset, N. Y., as their exclusive United States sales and service representative.

time wherever it can be bought at a bargain. But experts estimate it will take 500,000 tons to stabilize the market.

Another step, of questionable value, which has already been taken by some consumers, is earmarking, cause of the cross-hauling spree of 1948. Net effect today will be no different.

It will seriously disrupt the present distribution of scrap which was back to a functional normal. Earmarking will take scrap out of areas where it "belongs," bring back raiding by the big companies, force the small companies to push the price and cost them money in the process.

Breaking this market will be no job for junior.

Substitute Grades

On the positive side also is the fact that a lot of operators got out of the scrap business when the market collapsed last year and are now back in. The peddler is back on the truck and the scrap is coming out faster, although higher prices are not making any more of it.

Also, mills are going to try to use No. 2 grades. Some of them have been at work on this for the past month. But much of the tonnage is lacking qualitatively. There are even a few who believe that the fundamental problem is still quality and not quantity and that when the converters are again out of the picture the market will return to "normalcy."

Finally, scrap will soon start moving in from the southwest. While these three factors may be only drops in the bucket, the steel industry needs every ton it can get.

Seeks SEC Stock Registry

Washington — American Metal Products Co. of Detroit has filed a registration statement with the Securities & Exchange Commission seeking registry of 426,000 shares of common stock which seven large stockholders wish to sell. Par value is \$2 but no asking price was given.

GM-Union Pact—Milestone in Labor History

Agreement explodes surprise bombshell . . . GM assured of 5 years of unhalting production . . . Union gets liberal benefits and a modified union shop—By WALTER PATTON

Detroit—Union and General Motors officials after 28 hours of negotiation guided the same pen to write in big bold letters an unprecedented passage in labor history last week with GM's acceptance of the 5-year non-openable contract with the UAW-CIO.

Production Bliss

Some prophets of the trade were humbled as their predictions that GM-Union talks would lead to customary strife were spectacularly refuted. When released, the agreement had the effect of a surprise bombshell. It gives GM the promise of 5 untroubled years of production and the union pension, wage, security benefits in a modified union shop.

The length of the contract confounds many, when it is considered that the union was the target for criticism for signing a 2-year

contract with GM. But, observers feel, since GM entered negotiations with an eye to trading generous benefits for industrial security the union could not with grace hedge on the length of the contract.

In the stunned aftermath of hand shaking and smiles, Walter Reuther, union president, commented bleakly on the differing labor attitudes of Chrysler and GM. Both Chrysler and Ford contracts can be opened within a year for wages.

More Liberal Pension

In the light of persistent union attack of the cost-of-living allowance formula in the 1948 contract, continuance of the escalator clause was another surprise. This item and the annual improvement clause, increased from 3¢ to 4¢, has the appeal of guaranteeing

the worker a steady gain in his standard of living. First payment was made on May 29.

As foreseen, the GM pension plan is more liberal than others offered to auto workers. It is trustee and funded on a 30-year basis and the union sees payments rising to \$117.50 per month with the enactment of more munificent social security laws.

No Ironclad Pattern

Immediate value of the pact, all benefits included, is 19¢ an hour, says the union. The total package value during the 5-year contract span is put at 35¢ an hour. All concerned in Detroit are pondering the effects of the GM agreement on its competitors, Chrysler and Ford. Mr. Reuther noted that the GM agreement would not necessarily set an ironclad pattern for other firms.

Detroit Tool Shops Agree To UAW-CIO Area Pension Plan

Detroit—A sidelight surprise last week in labor bargaining here was the signing of Detroit area pension plan by 62 tool shops. The \$100 a month pension plan agreed to by the UAW-CIO and the Automotive Tool and Die Assn. was almost lost in the shuffle when news broke of the GM-union pact.

Toledo Dispute

Under the plan, member companies of the association will place funds in a common pool. Any worker in one plant may shift jobs to another participating company without loss of service credit—losing only his seniority. The union has labeled this settlement as a 10¢ package.

The argument that the Detroit tool and die settlement may provide a pattern for the present Toledo dispute is not strictly accurate, according to informed sources. In Detroit the member plants have joined for bargaining purposes for a number of years. There has been no previous association of the plants in Toledo which have been asked to bargain on an area basis.

Labor Gains in GM Contract

Detroit—In return for the production security of a 5-year union contract, General Motors negotiators bartered the following concessions to the UAW-CIO:

- (1) A \$100 per month jointly-administered pension plan, Social Security included, for employees aged 65 with 25 years' service. With more generous Social Security legislation, the pension jumps to \$117.50 a month.
- (2) A 4¢ an hour wage hike for each year of the contract, described by the UAW as a bonus for productivity. It was formerly 3¢ a year.
- (3) Continuance of the cost-of-living escalator clause, providing for a 1¢ slide up or down in line with the Bureau of Labor Statistics index.
- (4) The same wage base—about \$1.65 an hour.
- (5) A requirement that new employees join the union after 90 days for at least a year. Nonunion workers do not have to join.
- (6) A jointly-supported hospital-medical plan and a more comprehensive insurance, accident program.

CONTRACT COMPARISONS: Chrysler and Ford have the straight \$100 per month pension plan. They do not have the escalator clause and guaranteed annual productivity raises. Ford has a union shop and Chrysler does not.

British Rail Rate Boost Forces Pig Iron Prices Upward

London—Pig iron using industries of England have not escaped the recent rail rate increases unscathed. Although the steel industry has taken the 16 pct rate rises in its stride without a falter and is bearing them alone, foundry pig iron producers have been jacking up prices by a 70¢ per ton average.

Hematite is up a similar amount and basic pig iron for steelmaking has jumped 84¢ per ton. Low phosphorus pig iron and special irons are also on the upward path and increases have been registered in the prices of cast iron rain water and soil goods, gutters, and connections.

General steel prices remain un-

altered but because of higher zinc prices, galvanized sheets have taken a price upturn. Galvanized corrugated sheets, 24 gage, are now quoted at \$112.21 per ton of 2240 lb.

Ready Canada Stainless Mill

Welland, Canada—Preliminary testing on the line of Canada's first mills for rolling stainless steel sheet will be held in about a month. Mechanical installations in the North Plant of Atlas Steels, Ltd., here were completed in June and electrification is now in progress.

Work has been accomplished up to schedule and stainless steel sheet and light plate will be produced by late summer.

U.S. Business Ingenuity Can Save Day for Trade, Says Sawyer

New York—At World Trade Week ceremonies in New York and Philadelphia last week, Secretary of Commerce Charles Sawyer spoke on similar optimistic themes of ousting the roadblocks to international trade recovery. He stressed the important role American business must take.

He said in his New York speech that "solid reason for hope" exists for the solution of foreign investment problems and the attainment of Point Four aims if the ingenuity of American business is exercised. Financing and enactment of the Point Four program must be carried out by private business willing to invest abroad, he said.

U. S. Trade Balance

Secretary Sawyer also stated that American business was staffed with excellent teachers for foreign businessmen who need to know American methods of production and distribution. He spoke before an audience of 800, representing 41 foreign trade groups.

In Philadelphia, Secretary Sawyer urged freer trade and the closing of the dollar gap with international cooperation. A vital problem, he said, was balancing America's foreign trade at a level which will not disrupt domestic economy and yet permit the maximum contribution to international economic stability.

Ask Steel Offer Rejection

Washington—The Federal Trade Commission has before it a petition signed by two of its attorneys, asking that the proposed steel industry offer (THE IRON AGE, May 25, p. 89), which would end the Commission's price-fixing complaint, be rejected and that the case be reopened for the introduction of new evidence. Since it is an open secret that the Commission is preparing to reject the steel industry proposal, it would appear that the above petition would have little bearing.

April Iron & Steel Production by Districts

As Reported to American Iron & Steel Institute

BLAST FURNACE CAPACITY AND PRODUCTION —NET TONS	Number of Companies	PRODUCTION								
		Annual Blast Furnace Capacity	PIG IRON		FERRO- MANGANESE AND SPIGEL		TOTAL			
			Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date	Pct of Capacity	
									Current Month	Year to Date
Distribution by Districts:										
Eastern.....	12	13,353,580	1,074,234	3,680,946	22,088	104,498	1,096,320	3,785,444	99.8	86.2
Pitts.-Youngstn.....	16	26,735,520	2,083,978	7,308,336	21,088	72,598	2,105,066	7,380,934	95.7	83.9
Cleve.-Detroit.....	6	7,044,600	588,336	2,186,859	.....	.....	588,336	2,186,859	101.5	94.4
Chicago.....	7	15,897,190	1,156,428	4,084,705	.....	.....	1,156,428	4,084,705	88.4	78.1
Southern.....	8	5,141,250	417,674	1,482,657	10,821	26,104	428,495	1,510,761	101.3	89.3
Western.....	4	3,325,400	202,375	695,937	.....	.....	202,375	695,937	74.0	63.6
Total.....	36	71,497,540	5,523,025	19,439,440	53,995	205,200	5,577,020	19,844,640	94.8	83.5

STEEL CAPACITY AND PRODUCTION —NET TONS	Number of Companies	PRODUCTION								
		Annual Steel Capacity	TOTAL STEEL				Alloy Steel* (Incl. under total steel)		Carbon Ingots—Hot Topped (Incl. under total steel)	
			Current Month	Year to Date	Pct of Capacity		Current Month	Year to Date	Current Month	Year to Date
					Current Month	Year to Date				
Distribution by Districts:										
Eastern.....	25	19,875,480	1,587,836	5,822,789	97.7	89.1	98,139	383,469	280,512	1,094,059
Pitts.-Youngstn.....	34	39,145,920	3,226,805	11,730,610	100.2	91.1	389,727	1,482,728	364,974	1,251,984
Cleve.-Detroit.....	8	9,333,460	779,344	3,047,702	101.5	99.3	47,537	163,191	111,592	420,309
Chicago.....	15	20,777,520	1,775,949	6,719,888	103.9	98.3	134,064	510,385	238,241	945,784
Southern.....	8	4,560,820	406,233	1,489,274	108.8	99.3	5,109	18,031	6,096	19,878
Western.....	11	5,699,620	424,505	1,613,062	90.5	86.0	4,932	29,135	8,976	28,564
Total.....	80	99,392,800	8,212,672	30,423,325	100.4	93.1	680,508	2,566,937	1,010,391	3,730,578

* For the purpose of this report, alloy steel includes stainless and any other steel containing one or more of the following elements in the designated amounts: Manganese in excess of 1.55%, and Silicon in excess of 0.50%, and Copper in excess of 0.60%. It also includes steel containing the following elements in any amount specified or known to have been added to obtain a desired alloying effect: Aluminum, Chromium, Cobalt, Columbium, Molybdenum, Nickel, Titanium, Tungsten, Vanadium, Zirconium, and other alloying elements.

x Revised.

Heavy on Ore, Low on Skill, India Plans Steelmaking Boost

Government plans new works . . .
Two firms to expand production.

Calcutta—India is taking a toddler's step toward accelerated steel production and is trying to rid itself of the lethargy of centuries. With a population largely unskilled in manual trades but with bountiful resources vital to steelmaking, India is seeking to hoist production to 2¼ million tons per year by 1953 from a rock bottom level of 1¼ million tons.

Dream Building

Joining hands in the enterprise are the Tata Iron & Steel Co., the Steel Corp. of Bengal, and the Indian government. The firms have ambitious expansion plans and the government has recommended the establishment of at least one completely new plant, to be followed by a second if justified by demand. Construction is still in the wishful thinking state.

It is felt that India has the potential to become a big steel producer and a steel exporter. In the east of the country are plentiful supplies of high grade iron ore. India has more than enough manganese and is one of the world's leading exporters. Coking coal availability presents a problem. Vast areas have not been surveyed and India does not know if she is a "have" or a "have-not."

Skilled Labor Famine

Rich resources are counterbalanced by an acute dearth of workers skilled in steel production. Wages are low but India will not have a labor cost advantage in production because of the incredibly low productivity of the Indian worker, which the Tata Co. reports has declined one-third in recent years.

With a teeming population of 350 million, India's annual steel consumption is a paltry 1½ million tons. The United Kingdom with its 50 million population uses 14 million tons or 600 lb per capita to India's 10 lb.



King for a Day

San Francisco—The reins of industrial management of this city were relinquished for a day into young and unproven hands when 11 high school seniors "managed" 11 major business concerns. Shown above with W. C. Eshelman, general superintendent of Bethlehem Pacific's South San Francisco steel plant is Alfred Kenny, 17, a Samuel Gompers Trade School senior, selected as one of the teenagers most likely to assume executive posts. Mr. Eshelman gives Alfred a sampling of industrial savvy as he explains a blueprint of the plant's new openhearth furnace, now under construction in the background. The annual Youth-in-Business Day was sponsored by San Francisco.

Hotpoint Production Starts

Chicago—Tooling and machine installation of the Hotpoint, Inc. 500,000 sq ft Chicago Heights plant has been completed and production of a new line of heavy duty ranges and bake ovens has started, announced James J. Nance, president.

Army Awards Tank Contract

Washington—Bowen & McLaughlin have been awarded an Army contract for remanufacture and modification of 1140 M4 A1-76 medium tanks for \$4,916,059.94. Other recent Army contracts went to Borg-Warner Corp., \$307,062, and Young Spring & Wire Corp., \$305,062, comprising orders for 8,500,000 belt links.

Mine Modernization Approved

Washington — About \$965,000 worth of American equipment for modernization of nickel mining in New Caledonia is provided under a purchase approval last week by the Economic Cooperation Administration. The Societe le Nickel expects to double its prewar output range from 6,000 tons a year to 12,000 tons.

Auto Exports Less in '50

Washington—United States automotive exports for the first quarter 1950 were 24,423 trucks and buses, 23,634 passenger cars, and \$57.5 million worth of spare parts, according to Census Bureau figures. This is about half the exports of the '49 quarter.

American Zinc Buys War Facilities at 2 Plants from RFC

St. Louis — War-built government facilities at the Monsanto, Ill., and Fairmount City, Ill., plants of the American Zinc, Lead and Smelting Co. were purchased by the firm from the Reconstruction Finance Corp. for \$1,080,000 in cash. With the sale, the company activated a \$500,000 improvement program.

President Howard I. Young reported 1950 first quarter earnings of \$364,773 as compared with \$391,095 in the first quarter of 1949. This year's first quarter sales were \$10,358,383 against 1949's \$10,099,713.

ASMMA Holds 42nd Convention

Atlantic City, N. J.—The American Supply and Machinery Mfrs. Ass'n. at its recent annual convention here elected Franz Stone, president Columbus McKinnon Chain Corp., Tonowanda, N. Y., to the post of president.

Others elected were R. M. Johnson, Norton Co., Worcester, Mass., first vice-president; J. A. Proven, Porter-Cable Machine Co., N. Y., second vice-president; and C. F. Connor, B. F. Goodrich Co., Akron, treasurer.

Other parts of the program consisted of a report of the results of the 1949 "Analysis of Distribution", third such survey since 1940, and a speech by Ralph J. Cordiner, executive vice-president of the General Electric Co., stressing the sales end of American industry.

Long Voted Assn. Head

Dayton, Ohio—Robert O. Long, assistant purchasing agent for Standard Register Co. here, has been elected president of the Purchasing Agents Assn. of Dayton.

Also elected were: first vice-president, A. G. Ruediger, Air-Temp Div., Chrysler Corp., Dayton; second vice-president, Harold L. Williams, Mound Laboratories, Monsanto Chemical Co., Miamisburg, Ohio; national director, Paul Boorum, Moraine Products

Div., General Motors Corp., Dayton; secretary, Edwin K. Griest, Buckeye Iron and Brass Works, Dayton; treasurer, W. R. Schurene, Ohmer Corp., Dayton, and local director, E. G. Sander, Central Research Laboratories, Monsanto Chemical Co., Dayton.

Europeans Study American Know-How Under Marshall Plan

Washington—The ECA's technical assistance program reached a new high in April with the arrival of 223 European workers and technicians to learn American methods. It is estimated that 4000 will have completed such studies within another year.

Included in the April groups were British, French, Dutch, Austrian, and Turkish teams to study such subjects as foundry methods, machine tool techniques, productivity, chemical developments, public works projects, power development, aviation, and various business methods.

Marks 50th Anniversary

Worcester, Mass.—The Grinding Machine Div. of the Norton Co. is celebrating its fiftieth anniversary this year. Incorporated as the Norton Grinding Co., the division has produced more than 41,000 grinding machines since 1900.



"My wife's packing better lunches since I bought this plastic lunch box."

Bituminous-Coal 1948 Output Per Manhour Rises Over '43 Low

Washington—Output per manhour in the bituminous-coal mining industry in 1948 was 13 pct above the 1943 wartime low and 6 pct above 1945, according to the latest productivity report of the Bureau of Labor Statistics in Washington.

Manhour output remained virtually unchanged between 1947 and 1948. However, output per worker was 7 pct lower in 1948 than in 1947 primarily because of a decreased average work week to 38 hours in 1948 from 40.7 hours in 1947.

British Welcome American Manufacture of Mutual Benefit

New York—The welcome mat will be spread before Americans desiring to manufacture in England if they can show the British Board of Trade that their business will increase England's exports, increase its tax revenues, provide taxable income for British workers, and provide work in areas of low employment, said Howard A. Acheson, president of the Acheson Colloids Corp., Port Huron, Mich., and Acheson Colloids, Ltd., Plymouth, Eng.

He stated recently that the labor situation is better than described by the press and that Englishmen can do a workmanlike job despite a scarcity of machine tools. Mr. Acheson said that it is possible to make profits in England and bring them back to America.

MAPI Machine Replacement Formula Crusade Hits New York

New York — The Machinery & Allied Products Institute's crusade preaching application of its formula to determine replacement of worn-out or obsolete machines arrived here last week.

Several hundred industrialists from the metropolitan area gathered at the Waldorf-Astoria Hotel to hear Duncan J. Stewart, vice-

president of the Barber-Colman Co., Rockford, Ill., describe application of the MAPI formula to his own company.

Under the chairmanship of William J. Kelly, Institute president and senior partner of William Kelly & Co., a Chicago management counsel firm, the meeting was one of a series being held in key cities to advance the MAPI formula.

Other speakers were George Terborgh, Institute research director, and Everett M. Hicks, assistant manager, Grinding Machine Div. of the Norton Co., Worcester, Mass.

Railroads to Get New Type Passenger, Freight Equipment

Philadelphia—Six new Budd Co. self-propelled rail diesel cars (RDC) were ordered by the Pennsylvania-Reading Seashore Lines. The stainless steel, diesel powered cars seat 90 persons and can be operated from either end as a single unit, permitting the train to be split into separate units for different destinations.

Powered by two 275 diesel engines and equipped with disc brakes, the RDC cruises at 70 mph.

Cost Cutter

Another new development is the General American Transportation Co.'s damage-free (DF) box car to be tried by seven railroads. Though costing \$9,000, the 50 pct pay load increase reportedly will cut costs about 20 pct.

New shock absorbing equipment and loading methods will enable the DF cars to help eliminate annual damages of \$130 million sustained by the railroads, it is claimed.

A. O. Smith Expansion Sights Center on Tipp City Construction

Milwaukee—Electric motor manufacturing facilities in the east will be expanded by the A. O. Smith Corp. with enlargement and improvement of the recently purchased Whirl-A-Way Motors, Inc., plant at Tipp City, Ohio, said

J. M. Floyd, executive vice-president.

Construction will begin in June of a 60,000-sq ft factory, costing \$500,000. Production is scheduled for September. The Tipp City plant is now the eastern motor branch of A. O. Smith. Manager

is D. L. Mills, former president of Whirl-A-Way. He will be in charge of Dayton, Ohio offices.

Tipp City manufacture of fractional hp motors will be expanded to include 3-phase power units as well as the present line of single phase motors.

Nonferrous Metals Prices On Upward Trek

Mine owners, smelters not happy at prospect of returning peak prices . . . Resources inadequate to support high U. S. production . . . Buying tactics backfire—By JOHN ANTHONY

New York — Nonferrous metals buyers are whistling in the dark in the unfriendly surroundings of a sellers' market that budded a few months ago and is now threatening to overwhelm them with its rapid upward march of prices. Although a return to the pinnacle prices of 1948 is possible, neither mine producers or smelters express glee at the prospect.

Resources Inadequate

Since America uses most of the world's metals and minerals, world prices are keyed to market developments here and the inflationary trend of metal markets is caused by the high rate of American industrial activity. Domestic and foreign metals and ores available to the United States are not deemed adequate to support current heavy production for an extended period.

Metal demand has been lifted to its present intensity partly by last year's buying tactics—intended to

be shrewd but which proved a punishing boomerang. In '49 buyers left the market scene for months when inventory reductions were being made. They levered down prices by buying only when forced.

Then producers sliced production and the buyers felt the boomerang in the lost production. In some lines former production rates have yet to be fully restored.

Now buyers do not need 20-20 vision to see the handwriting on the wall and some are prepared to pay higher-than-market prices for metals. They need to build up inventories as well as buy for present production. The clamor for metals is seeping into such markets as lead, cadmium, and antimony where long-range shortages are not apparent.

Deliveries Plunge

Copper is only 3¢ a lb under the postwar peak of 23½¢, which might be wiped out in a few months with continuance of present demand. Producers have scant reserves of refined copper to maintain required rates of delivery.

Stocks fell to 57,000 tons at the end of April, more than 10,000 tons lower than in any month of the record postwar consumption year of '48. Consequently April deliveries were more than 21,000 tons under all-high March deliveries of 123,000.

A copper price advance of several cents per lb in the next few months is signalled even if tariff suspension is continued. With the



"Thanks again, Sir, but must we deliver this next order way out here?"

Kaiser Aluminum News

need for foreign copper, further suspension is likely. Domestic producers fear a return to the copper market of 1949 if industry slackens and have taken steps to secure protection against imports.

Zinc on March

Zinc prices are still well below the 1949 market peak of 17½¢ per lb for Prime Western. But the market is advancing rapidly. In a little more than 2 months the price has gone up eight times for a total of 2¾¢. The worldwide shortage of zinc ore will probably affect the market in the latter half of '50.

As long as industrial activity continues at present rates, heavy demand for galvanized products, die castings and brass mill products can be expected to result in further zinc price rises.

Government Buys

Last year when the supply was plentiful, the government, like other buyers, went out of the market. But now that there is a shortage, the government wants to buy for stockpiling.

Even aluminum prices are moving upward. Last week's ½¢ advance in pig and ingots is being translated into semi-finished products. Most items have been advanced by ½¢ per lb across the board. But plates will be raised 1¢ per lb.

Republic Unveils Plans to Expand Steelmaking

Aims at 150,000 ingot ton boost per year by increasing open-hearth size . . . To install new 54-in. temper mill . . . Tonnage increase will be in slabs . . . Expansion to cost about \$9 million.

Cleveland—Plans for a big expansion of steel-making capacity in the Cleveland district, more than 150,000 ingot tons annually, and installation of a new 54-in. temper mill, were announced this week by Republic Steel Corp.

Items of the Plan

Major phases of the plan include:

(1) Increasing the heat size of all of the 15 openhearth furnaces to tap 220 tons a heat, compared with 200 tons at present. This will increase ingot production here by more than 150,000 tons annually.

(2) Structural changes in the big openhearth building, including strengthening columns which support crane runways on the pit side of furnaces and strengthening cranes and other materials handling equipment.

(3) Construction of a fourth slab heating furnace with a capacity of 100 tons per hour at the strip mill. However, a study is being made at present to determine whether the additional heating capacity can be obtained by

enlarging the three present heating furnaces.

(4) A "considerable" increase in coil annealing capacity, requiring addition of one or more coil annealing furnaces.

(5) Final phase of the project will involve purchase and erection of a new 4-high, 54-in. temper mill to replace two present 2-high temper mills and provide ample additional rolling capacity for the increased tonnage.

Fastest Hot Strip Mill

All of the increased ingot tonnage will be rolled into slabs, which will be directed to the company's 98-in. hot strip mill. According to Republic spokesmen, this mill is the largest and fastest continuous hot strip mill.

Originally designed to produce 75,000 tons of hot rolled steel per month when built in 1937, it rolled substantially more.

However, the expansion program will not make any additional steel available before early 1951, Republic spokesmen emphasized, but it will ultimately permit Republic to market additional cold rolled sheets.

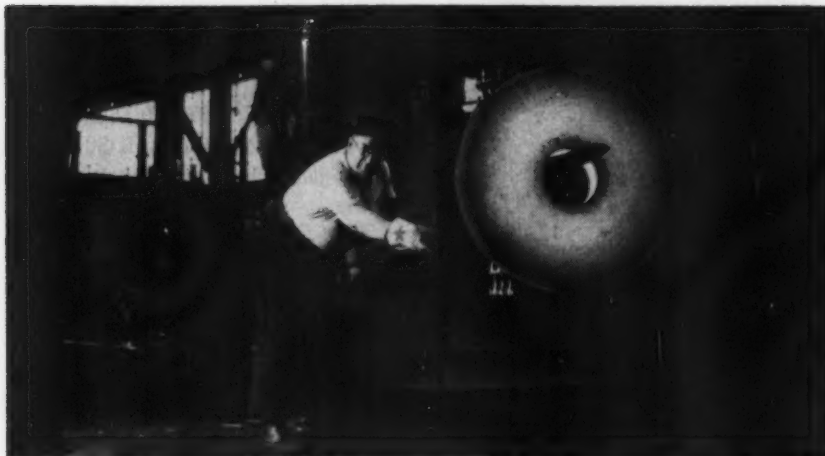
To Cost \$9 Million

Republic declined to comment on the cost of the expansion, but it is understood it will total about \$9 million.

Charles M. White, Republic president, in announcing the expansion project expressed confidence in the future outlook for the steel industry.

"We have examined this project very carefully and feel that the investment of the large amount of money required to make this expansion is well justified in the face of current business conditions and the outlook for the next several years for this section of the country," he stated.

DON'T BITE: This doughnut offered by the kindly gentleman in the background may lie a little heavily on the stomach. Right out of the furnace and red hot, it is the world's largest and most inedible doughnut and was made in the Kropp Forge Co.'s Chicago plant. The doughnut is in the first stage of what will eventually be a mammoth ring gear.



British Industrial Team Admits American Wages Buy More

London—Complacent British reasoning employed when comparisons of British and American pay checks are made was branded as fallacious by 12 British trade union leaders, engineers, and bosses, reporting on a recent tour of the American materials handling industry.

They contradicted the British defense that it is not so much the number of dollar bills in the pay envelope as what can be bought with them. The report stated flatly that American wages "are not only higher than in Britain but are also higher in relation to the cost of living."

Get Army Steel Contracts

Washington — Pacific Iron & Steel Co. of Los Angeles has been awarded a contract for 21 steel warehouse buildings, 40 by 100 ft, for a total price of \$147,630.

Other Army contracts include 1.1 million lb of flat steel strapping at a cost of \$153,620 and a tools and equipment order amounting to \$150,469.74 to Lyons Metal Products, Aurora, Ill. Maxey & Leftwich, of Lubbock, Tex., were awarded a construction contract amounting to \$491,745.33.

Inland to Install New Line

East Chicago, Ind.—A new, production-increasing 60-in. pickling line will be installed at the Inland Steel Co. plant here. An unusual procedure will be the use of shallow immersion at the delivery end which will be made possible by using twin rolls in the pickling tank. General Electric Co. will supply the electrical equipment.

Get Air Force Work

Washington—Recent Air Force contracts included the following awards: B. F. Goodrich Co., 56x16 wheels and brakes, \$1,330,858; American Coleman Co., F-55 towing tractor, spare parts, data, \$1,296,122; General Motors Corp.,



STRANGE SIGHTS: Liaquat Ali Khan, prime minister of Pakistan, peers intently at machines processing California tin plate in the Pittsburg, Calif., plant of the Columbia Steel Co., U. S. Steel subsidiary. The man with the instructively pointed finger is J. D. McCall, general superintendent of the plant. Others left to right are Brigadier N. A. K. Raza, Pakistan Embassy military attache; M. A. H. Ispahani, Pakistan ambassador; and George W. Wolk, president of the U. S. Steel Export Co.

blades, tools, spare parts, for T-98 aircraft, \$544,913; and Lapointe Machine Tool Co., broaching machine, \$106,797.

Gas Earnings Rise

New York—In April, the first full month of operations after the completion of the firm's expanded pipe line system, operating revenues were \$2,772,000 as compared with \$812,000 in April 1949, announced the Texas Gas Transmission Corp. Net income for the month was \$536,000, as compared with \$169,000 in '49.

Kaiser Pours 5 Millionth Ton

Fontana, Calif.—Producing a million tons of steel ingots in the last 11 months, Kaiser Steel Corp. recently poured its five millionth ton since openhearth operations began in May 1943 at the Fontana plant. Kaiser's openhearth output is currently at a rate of 1.2 million tons of ingots per year.

Casting Shipments Report

Washington—March average daily shipments of gray iron castings were 5 pct under February and 7 pct below March 1949 shipments, reports the Bureau of Census, Department of Commerce.

Daily shipments of nonferrous castings in March were 2 pct more than February and 26 pct greater than March '49, reported the Bureau.

ASME to Hold Meetings

New York—The Twenty-Second Oil and Gas Power Conference, to be held June 12 to 16 at the Lord Baltimore Hotel, Baltimore, and the Sixteenth National Applied Mechanics Div. Conference, to be held June 22 to 24 at Purdue University, Lafayette, Ind., were recently announced by the American Society of Mechanical Engineers. Information may be obtained from the ASME at 29 West 39th St., New York 18, N. Y.

Viewing the News from

The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

**"Joy Among
The Planners"**

OFFICIAL Washington is animated by a mood of elation. The reason—a sharp rebound in business with a vigor and volume that seems certain to carry the boom through the greater part of the year, if not beyond.

Even the most convinced Keynesians in the high councils of the Administration had felt some doubt regarding the year 1950. It was generally believed that this would be a critical year, a year in which boom business might have to come down to some lower, normal base.

It was recognized that such a retreat, however necessary, would result in increased unemployment, lower corporate earnings, and a decline in national income. This would create serious problems for the Administration—fiscal, political, international.

The current boom resolves all doubts.

The credit for this, according to high level Washington thinkers, is due to deficit financing, and a number of specific stimulants, such as cheap credit for new housing, etc.

It is obvious that all these stimulants have their origin in the ability of the government to live off the cuff. To continue this peculiar therapy calls for hocus pocus in the government bond market.

The glee of the boys in Washington may be premature. Under the surface a ferment is developing.

A crisis has developed in the relations between the Treasury and the Federal Reserve Banks. The success of the government's fiscal program, its ability to issue billions of its IOUs without worrying about the market, has been due largely to the cooperation of the Federal Reserve Board and the twelve Federal Reserve Banks. These have stood

ready to absorb any surplus offerings of government securities and thus maintain the price of government bonds and the credit of the Treasury.

Federal Reserve officials feel the time has come when this abuse of a central bank's functions must cease; when the securities of Uncle Sam must stand on their own feet without the artificial props hitherto provided by the Federal Reserve Banks. If the supports provided for the bond market—supports which have so far been effective—are withdrawn, further use of government credit to finance deficits may become a serious problem.

A second development, whose full import neither the Treasury nor the public as yet appreciates, is the growing revolt among commercial bankers against the policy of complete and willing cooperation with the Treasury.

The official policy of the American Bankers Assn. must necessarily be circumspect and cannot be openly critical on a matter so delicate as the credit of the government. However, individual bankers are under no such restraint. Privately their comments on the Treasury request are vigorous and unequivocal. Almost without exception they say that they will not encourage their clients to buy the IOUs of a debtor who refuses to live within his means and who betrays every intention of undermining the substance of the currency with which he will ultimately repay his debt.

The stimulants which the government has applied to business have become stimulants of limited duration. The period of license is approaching its end. The government may soon find it necessary again to comply with those arduous and merciless precepts of finance which each of its individual citizens must respect if he hopes to remain solvent.

Wabash R.R. Buys Diesels

St. Louis — Improvements and addition to roadway and rolling stock in 1950 will cost the Wabash Railroad Co. \$22,300,000—\$4,600,000 for roadway and \$17,700,000 for rolling stock, said Arthur K. Atkinson, president, at a recent shareholders meeting here.

He said that orders had been placed for 26 diesel electric freight locomotives, 20 diesel electric switch locomotives, and four diesel road switch locomotives.

Austrian Steel Gets \$8 Million

Washington — The European Cooperation Administration recently released \$8 million in counterpart funds for modernization and improvement of the Austrian steel industry.

Altogether about \$18 million of Austrian industrial spending was approved, the remainder of \$10 million going for development of electric power facilities. Several million in counterpart funds had already been released for use by the mining, chemical, and non-ferrous metals industries.

Ferguson Co. Control Changes

Cleveland — In a \$7 million transaction, control of H. K. Ferguson Co. went from John and Stirton Oman, of the Oman Construction Co., Nashville, Tenn., to the Morrison-Knudsen Co., Inc.

No change in personnel or policies of the purchased company is contemplated, said Otto F. Sieder, who will continue as executive vice-president and general manager of Ferguson.

French Get Marshall Plan Tools

Washington — Approval last week of French purchases of \$2.4 million worth of machine tools and \$655,000 worth of metalworking equipment brought total Marshall Plan spending to \$9.1 billion.

About \$910,000 worth of the machine tools and \$100,000 of the metalworking machinery is slated for modernizing the French Citroen automobile factory.

STEEL CONSTRUCTION NEWS

New York—April bookings of fabricated structural steel were estimated at 150,542 tons, according to the American Institute of Steel Construction, Inc. While not equalling the high level of 189,420 tons estimated for March, the April bookings were some 30% higher than either of the first 2 months of the year. The total for the 4 months is 576,943 tons, or an increase of 18% over the bookings for the corresponding months in 1949.

April shipments amounted to 155,072 tons, practically the same as March, but approximately 25,000 tons greater than January or February. The 4 months shipments were 576,734 tons as compared with 663,716 tons in the same 1949 months.

Both bookings and shipments for the year to date show an increase of greater than 30% over the average for the same period in the pre-war years of 1936/1940.

The backlog (tonnage of orders booked and available for future fabrication) for the next four months only, stands at 540,213 tons.

Following is the complete tabulation of bookings and shipments:

Estimated Total Tonnage for the Entire Industry			
	1950	1949	Avg. 1936/1940
CONTRACTS CLOSED			
January	119,317*	130,418	107,578
February	117,664*	108,764	96,280
March	189,420*	149,079	124,558
April	150,542	98,802	110,783
Totals	576,943	487,063	439,199
SHIPMENTS			
January	135,253*	152,746	92,578
February	129,628*	145,879	88,626
March	156,781*	185,885	115,031
April	155,072	179,206	123,650
Totals	576,734	663,716	419,885
TONNAGE AVAILABLE FOR FABRICATION WITHIN THE NEXT FOUR MONTHS			
	540,213	628,111	319,163

*Revised

Fabricated steel awards this week included the following:

- 2000 Tons, Camden-Burlington Counties, N. J., New Jersey Turnpike Authority. Contract 27, Savin Construction Corp., New Haven, Conn., low bidder.
- 1000 Tons, Voltaire, N. D., power station, to Allied Structural Steel Co., Chicago.
- 632 Tons, Milwaukee, warehouse for Millprint, Inc., to Wisconsin Bridge and Iron Co., Milwaukee.
- 400 Tons, Freeport, Ill., junior high school, to Henry E. Grempe Co., Chicago.
- 223 Tons, Lake County, Ill., project TH-P7, bridge for state of Illinois, to Milwaukee Bridge Co., Milwaukee.
- 200 Tons, Wilmington, Del., Delaware State Highway Dept., Conduit & Foundation Co., Philadelphia, low bidder.
- 158 Tons, South Braintree, Mass., Armstrong Cork Co., to Bethlehem Steel Co., Bethlehem.
- 131 Tons, New Haven, Conn., two span rolled beam bridge on Howard Ave., relocation of U. S. Route 1. E. T. Nettleton, New Haven, district engineer. D. V. Frione and Co., New Haven, low bidder.

Continued on Next Page



**So—We Sold Them the Pilot Model
of Our New FT (100% Functional)
Fork Truck Which Had Been in
Their Plant on Test**

● Put yourself in our place. Our engineers had been instructed to design a new 3000 to 4000 lb. capacity electric fork truck—a completely functional “work horse”—retaining traditional Baker quality and ruggedness and adding features that contribute to greater utility, safety and convenience.

For months they worked like demons — analyzing basic materials, testing controls, motor characteristics, hydraulic equipment, studying every essential truck function, designing, re-designing, assembling, re-assembling.

Finally they said —“HERE IT IS!”

“Looks like a lot of truck,” said our management, “but how much will it cost?”

“LESS THAN ANY TRUCK IN ITS CLASS!” was the answer.

“Will it do the job?”

“LOOK AT THESE TEST RECORDS!”

Our engineers had subjected this truck to exhaustive tests covering every conceivable truck function. It had come through with flying colors.

BUT WE WANTED TO BE SURE!

So we selected a plant which had just about the toughest operating conditions you'll find anywhere . . . and put one of the pilot models on test there.

This plant is a high-production foundry. Abrasive dust, heavy, punishing loads, typical foundry floor conditions,

continuous, round-the-clock, three-shift operation—the most strenuous service you'll ever ask of a truck.

Frankly, no industrial truck had ever been able to “stand the gaff” in this foundry.

BUT THE BAKER FT DID!

From the day it was installed, there was NOT ONE MINUTE OF DOWN TIME!

As a result, the company insisted on keeping *this truck*; the pilot model which was in their plant on test!

That's the story of the development of the new Baker FT 3000 to 4000 lb. capacity Electric Fork Truck. Production models are now rolling off the assembly line in our new modern plant. Write us, or ask your nearest Baker representative to give you details on the toughest, lowest-priced, fork truck in its class.



Baker FT Fork Truck delivering rough castings to tumbling machine at the Taylor & Boggis Foundry.

THE BAKER INDUSTRIAL TRUCK DIVISION of The Baker-Rauland Co.

1227 WEST 80TH STREET • CLEVELAND 2, OHIO

In Canada: Railway and Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS

Handling Work is **STOP** and **GO...**

It's an intermittent service in which battery industrial trucks have many natural advantages. They start instantly, accelerate smoothly, operate quietly, give off no fumes, and consume no power during stops.

★

Battery trucks "deliver the goods" with double dependability when they are driven by EDISON Nickel - Iron - Alkaline Storage Batteries. With steel cell construction, an electrolyte which pre-

serves steel, and a foolproof electrochemical principle of operation, they are the most durable, trouble-free and long-lived of all batteries.

★

If you do not already use EDISON, get a current price quotation . . . you will probably find initial cost *much lower than you think*; annual operating cost *less than you pay now!*

ADVANTAGES OF EDISON NICKEL-IRON-ALKALINE BATTERIES:
They're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle.



EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES



EDISON STORAGE BATTERY DIVISION
of Thomas A. Edison, Incorporated, West Orange, N. J.
In Canada: International Equipment Co., Ltd., Montreal and Toronto

Construction Steel News

Continued

- 130 Tons, Minnehaha County, S. D., bridge, to Hassenstein Steel Co.
- 115 Tons, Buchanan County, Iowa, bridge project F943/1/ to Clinton Bridge Works, Clinton, Iowa.
- 115 Tons, Newcastle County, Del., Delaware State Highway Dept., through Conduit & Foundation Co., Philadelphia, to American Bridge Co., Pittsburgh.
- 100 Tons, Chicago, Lake Street elevated modification for CTA, to American Bridge Co.
- 100 Tons, Urbana, Ill., Animal Science Building, to Henry E. Gremp Co., Chicago.

Fabricated steel inquiries this week included the following:

- 1750 Tons, Gloucester-Camden-Burlington Counties, N. J., New Jersey Turnpike Authority, Contract 33, nine bridges, due June 15.
- 1130 Tons, Hudson County, N. J., New Jersey Turnpike Authority, Contract 35, overpass, due June 15.
- 1000 Tons, Philadelphia, Rittenhouse South Apartments, through McCloskey & Co., due June 2.
- 173 Tons, Allegheny County, Pa., State Highway & Bridge Authority, LR 765(3a), due June 16.
- 131 Tons, East Hartford, Conn., 50 foot clear span, rolled beam bridge and 845 feet of bituminous macadam pavement.
- 100 Tons, Shelton, Conn., 3 span continuous I beam bridge. E. T. Nettleton, New Haven, Conn., district engineer.

Reinforcing bar awards this week included the following:

- 1000 Tons, Gloucester-Camden-Burlington Counties, N. J., New Jersey Turnpike Authority, Contract 27(2), Savin Construction Corp., New Haven, Conn., low bidder.
- 600 Tons, Philadelphia, Philadelphia State Hospital, Female Patients Building, John W. Robbins & Co., Philadelphia, low bidder.
- 220 Tons, Chicago, St. Peter's Church and Monastery, to Joseph T. Ryerson and Son, Inc., Chicago.

Reinforcing bar inquiries this week included the following:

- 589 Tons, Burlington-Mercer Counties, N. J., New Jersey Turnpike Authority, Contract 36(3), due June 8.
- 535 Tons, Mercer-Middlesex Counties, N. J., New Jersey Turnpike Authority, Contract 29(4), due June 1.
- 450 Tons, Chicago, Roscoe Street sewer, John C. Tully Co., Chicago, low bidder.
- 265 Tons, Freeport, Ill., high school, James McHugh Construction Co., Chicago, low bidder.
- 193 Tons, Salem-Gloucester Counties, N. J., New Jersey Turnpike Authority, Contract 24(1), due June 8.

Building Lag Reasons Cited

Washington — Sharp increases in construction costs and the inability to organize risk capital because of high taxes on personal income are primary reasons why postwar business and industrial construction has lagged in the wake of record-breaking business in other lines, stated the Machinery and Allied Products Institute in an analysis entitled "Capital Goods Review."

NEW STRIP MILL



Photo taken during last stages of construction.

Here's good news for strip users . . . hot rolled strip is now coming out of our new 30 inch mill at Ivy Rock, Pennsylvania. This mill is the latest link in our chain of production and control extending all the way from the mine to you—another example of the progressive

expansion of Alan Wood Steel Company to serve you better. Take advantage of this new source of supply. Put your problems in alloy or carbon steel up to our Metallurgical Department. Your inquiry will receive their prompt attention.

Over a Century of Iron and Steel Making Experience

STEEL COMPANY

IVY ROCK, PA. SWEDELAND, PA. DOVER, N.J. OXFORD, N.J.

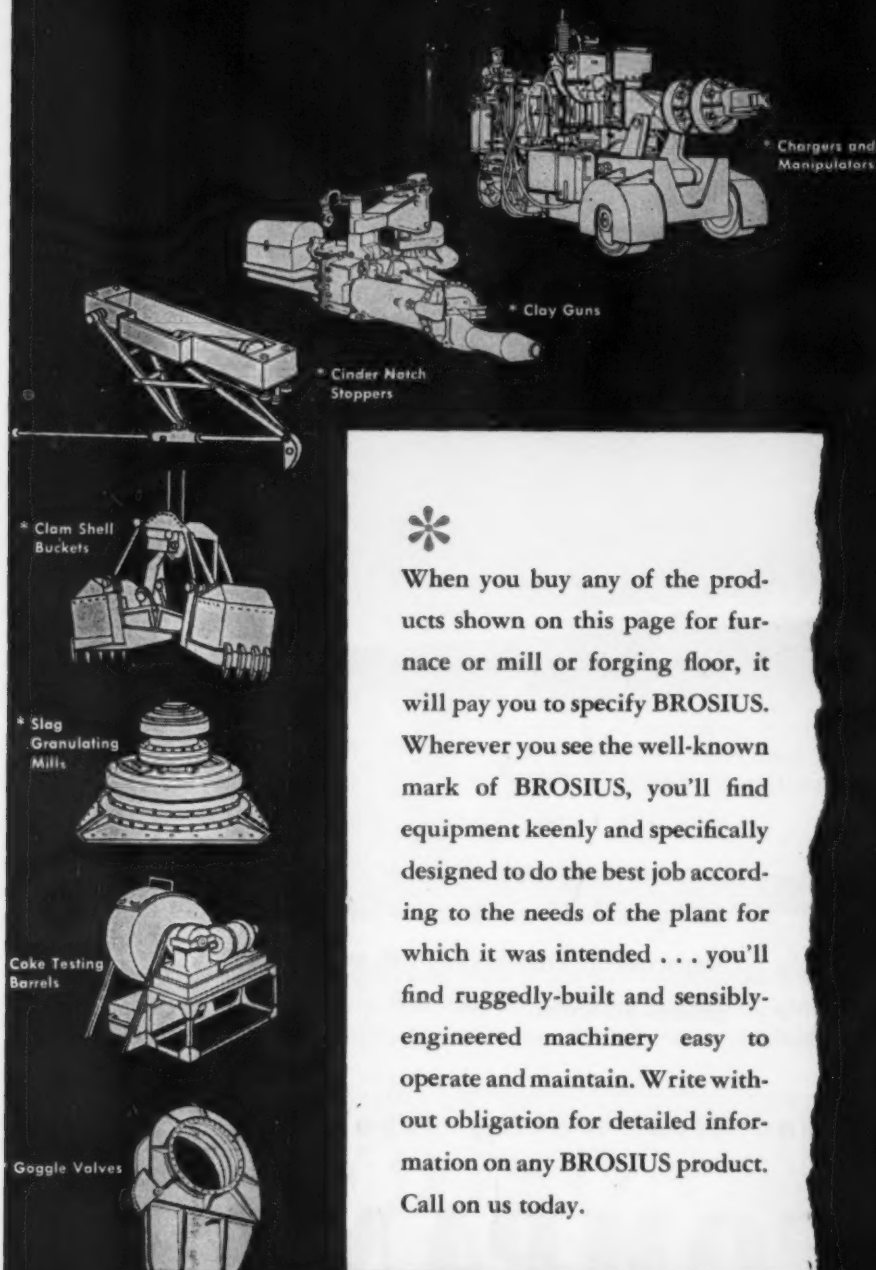
NEW YORK, PHILADELPHIA, PITTSBURGH, RICHMOND, SAN FRANCISCO, ST. PAUL, SEATTLE

Montreal and Toronto, Canada; A. C. Leslie & Co.

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When you buy any of the products shown on this page for furnace or mill or forging floor, it will pay you to specify BROSIUS. Wherever you see the well-known mark of BROSIUS, you'll find equipment keenly and specifically designed to do the best job according to the needs of the plant for which it was intended . . . you'll find ruggedly-built and sensibly-engineered machinery easy to operate and maintain. Write without obligation for detailed information on any BROSIUS product. Call on us today.



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Dates to Remember



June 1-2—American Society for Quality Control, national convention and mid-west conference, Milwaukee Auditorium, Milwaukee. Society headquarters are at 4949 W. 65th St., Chicago.

June 1-3—Electric Metal Makers Guild, Inc., annual meeting, Shawnee Hotel, Springfield, Ohio. Guild post office address is Box 6026, Mt. Washington Station, Pittsburgh.

June 4-7—National Industrial Service Assn., Inc., annual convention, Hotel Statler, Boston. Association headquarters are at 818 Olive St., St. Louis.

June 4-9—Society of Automotive Engineers, summer meeting, French Lick Springs Hotel, French Lick, Ind. Society headquarters are at 29 W. 39th St., New York.

June 5-7—American Gear Manufacturers Assn., annual meeting, The Homestead, Hot Springs, Va. Association headquarters are in the Empire Bldg., Pittsburgh.

June 8-10—National Society of Professional Engineers, annual meeting, Hotel Statler, Boston. Society headquarters are at National Press Bldg., Washington.

June 11-14—National Purchasing Agents Assn., annual convention, Public Auditorium, Cleveland. Association headquarters are at 11 Park Place, New York.

June 12-16—American Electroplaters' Society in collaboration with the Electrodepositors' Technical Society of England, international electrodeposition conference, Statler Hotel, Boston. Society headquarters are at 473 York Road, Jenkintown, Pa.

June 12-16—American Society of Mechanical Engineers, oil and gas power conference and exhibit, Lord Baltimore Hotel, Baltimore. Society headquarters are at 29 W. 39th St., New York.

June 19-23—American Society of Mechanical Engineers, semiannual meeting, Hotel Statler, St. Louis. Society headquarters are at 29 W. 39th St., New York.

June 22-23—Malleable Founders' Society, annual meeting, The Homestead, Hot Springs, Va. Society headquarters are in the Union Commerce Bldg., Cleveland.

June 26-30—American Society for Testing Materials, annual meeting and exhibit, Chalfonte-Haddon Hall, Atlantic City. N. J. Society headquarters are at 1918 Race St., Philadelphia.

Sept. 5-9—National Chemical Exposition, Chicago Coliseum, Chicago. American Chemical Society, Chicago Section headquarters are at 86 E. Randolph St., Chicago.

Sept. 12-14—Society of Automotive Engineers, tractor meeting, Hotel Schroeder, Milwaukee. Society headquarters are at 29 W. 39th St., New York.

Sept. 13-15—National Petroleum Assn., annual meeting, Hotel Traymore, Atlantic City, N. J. Association headquarters are in the Munsey Bldg., Washington.

Oct. 23-27—National Metal Congress & Exposition, International Amphitheater, Chicago. American Society for Metals headquarters are at 7301 Euclid Ave., Cleveland.

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is indispensable to the power of America

The bituminous coal industry
has the strength—the know-how—
to meet *any* challenge.

Only with indispensable bituminous
can the greatness of America be maintained.

For excellent bituminous coals
to meet your every need,
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FOR MASS PRODUCTION OF A QUALITY PRODUCT THEY CHOOSE CLEARING

The 1900 ton double action Clearing press in this picture is producing bathtubs in the new plant of AllianceWare, Inc., at Alliance, Ohio. The entire layout was carefully planned for the most modern production set up that could be devised.

The Clearing press fits perfectly into this kind of planning, because Clearing presses are designed and built for the high precision, high production demands of today's industry. Cost advantages extending for years to come will result from Clearing's rigid, welded steel construction and from the precise relatively maintenance-free operation of the crankless mechanism.

If you are planning for improved production and lower costs, you can't afford to overlook the contribution which Clearing can make in the realization of your aims. It costs you nothing to consult us. Tell us your problem.

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THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION
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FREE

PUBLICATIONS

Continued from Page 36

manual also describes general features of Optimus vapor degreasing equipment. *Optimus Equipment Co.*

For free copy check No. 8 on postcard p. 37.

Drill and Tap Chucks

Complete specifications for S-J drill and tap chucks are presented in a new 8-p. bulletin. Also contained is a new revised net price list showing price reductions of over 50 pct on popular sizes of style A tap chucks. *Scully-Jones & Co.*

For free copy check No. 9 on postcard p. 37.

Gage Blocks

Webber precision gage block sets in steps of 0.00005 in., individual special size blocks, heavy duty gage blocks, angle gage blocks in steps of one second and Carblox (carbide) wear gages are described in a series of data sheets listing sets available and prices. *Webber Gage Co.*

For free copy check No. 10 on postcard p. 37.

Powered Wheelbarrow

Features and versatility of the Moto-Bug powered wheelbarrow are graphically described in a new 4-p. folder. Specifications are listed in the catalog, which also contains dimensional drawings. *Kwik-Mix Co.*

For free copy check No. 11 on postcard p. 37.

Gas Unit Heaters

Pittsburgh gas unit heaters, featuring cast iron heat exchangers, are illustrated and described in a new revised folder. Specifications for six sizes, ranging from 85 to 215 thousand Btu per hr, are included. *Automatic Gas Equipment Co.*

For free copy check No 12 on postcard p. 37.

Molding Plastic Faster

A new 4-p. illustrated folder shows how the automatic compression molding Multipress works for molding plastic parts four times

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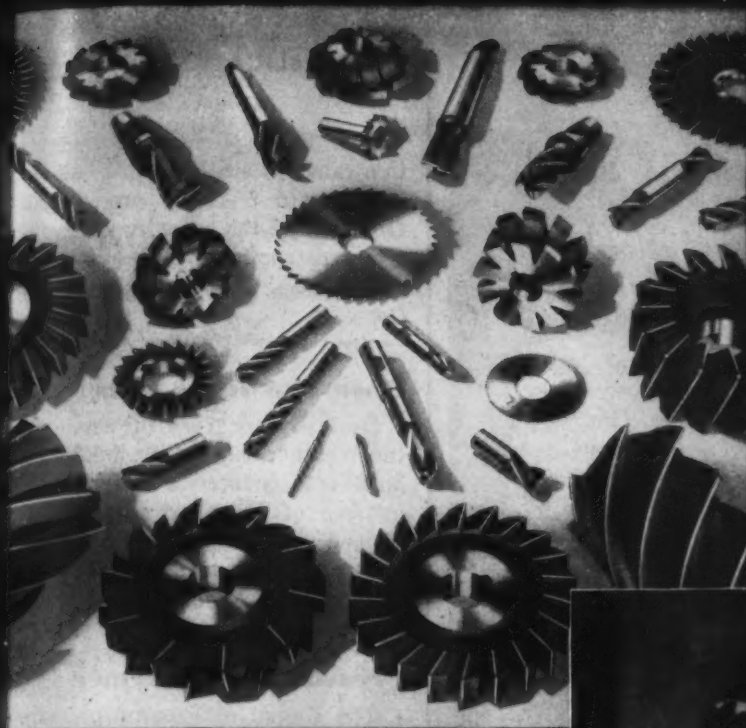
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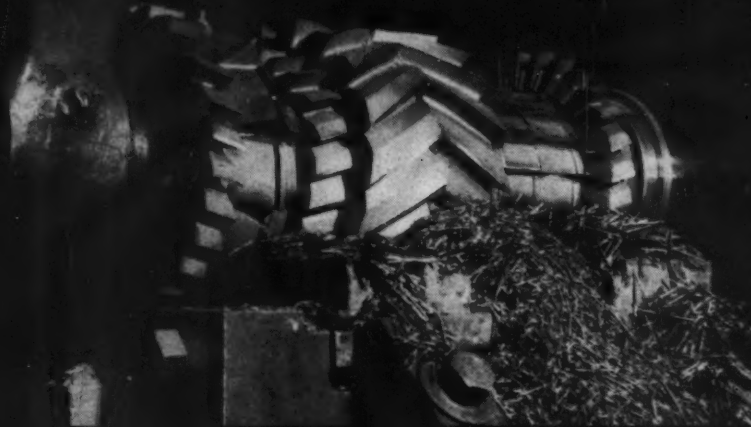
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In the process of manufacturing an unsurpassed line of machinery, tools and other products, Brown & Sharpe is one of the world's largest *users* of milling cutters. Brown & Sharpe cutter design engineers have the opportunity to see at first hand the needs for specific jobs, and how the many possible solutions work out. This system of design, trial, and improvement tolerates no second best results. In each and every cutter application, Brown & Sharpe manufacture demands the best, and Brown & Sharpe experience is able to produce it.

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PLAIN MILLING CUTTERS • HELICAL PLAIN MILLING CUTTERS • SIDE MILLING CUTTERS • STAGGERED TOOTH SIDE MILLING CUTTERS • INSERTED TOOTH CUTTERS • END MILLS • ANGULAR CUTTERS • CONVEX AND CONCAVE CUTTERS
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efficiency and cost savings
performance proven at
ANTHES-IMPERIAL CO., LTD.

Anthes-Imperial Co., Ltd., St. Catherines, Ont., Canada, is the largest producer of soil pipe in the British Empire. A Dustube Dust Collector is used for ventilating their large Wheelabrator Cabinet and a battery of grinders.

Mr. J. L. Fetes, Foundry Superintendent

"When I came to this foundry, I was very happy to discover that all cleaning and grinding operations were being ventilated with a Dustube Dust Collector. My experience with these units in other foundries has been exceptionally good in terms of efficiency and cost-saving performance. The simple, practical design of the Dustube provides the highest efficiency at the lowest possible cost."



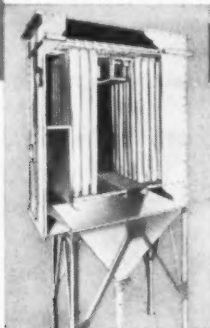
Mr. W. J. Cameron, Mechanical Superintendent

"The Dustube Dust Collector has been a profitable investment from every standpoint. We benefit in a business way through employee good will and their freedom from worry of dusty conditions far beyond the small amount invested in the collector. The Dustube is a simple and compact unit providing dependable, economical performance."



Mr. Alfred Briard, Maintenance Foreman

"Our Dustube Dust Collector operates so quietly and efficiently that the only attention it has required is periodic inspections. These are fast and simple since all work is on the clean air side of the collector. Maintenance is at a minimum because the tubes are never under tension, and never in contact with abrading or corrosive metal."



DUSTUBE ADVANTAGES

- BETTER DUST REMOVAL—Simple, fast, thorough. Shortens cleaning time.
- POWER SAVINGS—Lower resistance to air flow. Lower air velocities.
- HIGH EFFICIENCY—Nearly 100% efficient by convincing tests.
- EASE OF INSPECTION—Clean, safe, simple. No parts to remove.
- DUSTUBE FILTERS—No abrading metal contact. Easy to ship, store and handle.
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Write today for Catalog 72-A



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OFFICES IN PRINCIPAL CITIES
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FREE PUBLICATIONS

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faster. This equipment is available in a range of sizes from 1 to 35-ton capacity in C frame presses and from 1 to 15-ton capacity in strain-rod construction, as described in the bulletin. *Denison Engineering Co.*

For free copy check No. 13 on postcard p. 37.

Hose and Hose Ends

Designed for ease of assembly, the Weatherhead Reusable all steel hose end connection embodies a number of other advantages, described in a new 20-p. catalog also listing a complete selection of industrial hose. *Weatherhead Co.*

For free copy check No. 14 on postcard p. 37.

Pressure Transformer

The Hagan differential pressure transformer, used in measuring differential pressures for indicating, recording and controlling the rate of flow of steam, gas or liquid fuel, water and other materials, is described and illustrated in a new 4-p. folder. *Hagan Corp.*

For free copy check No. 15 on postcard p. 37.

Coolant Unit

The Lubri-King portable foot-controlled coolant pump, for putting the right amount of coolant where you want it when you want it, is described on a new illustrated data sheet. *W. A. Horejsi Co.*

For free copy check No. 16 on postcard p. 37.

Testing Sieves

Newark ASTM and market grade testing sieves are described in a new 4-p. folder. Specifications and prices for the various sizes are listed, and information is also presented on the End-Shak testing sieve shaker. *Newark Wire Cloth Co.*

For free copy check No. 17 on postcard p. 37.

Steam Traps

Complete with capacity tables, installation diagrams, as well as data, charts and formulae for determining the proper size trap for specific applications, a new 32-p. illustrated catalog describes a large number of various Nicholson steam, air and gasoline traps. *W. H. Nicholson & Co.*

For free copy check No. 18 on postcard p. 37.

Resume Your Reading on Page 37

NEW

PRODUCTION IDEAS

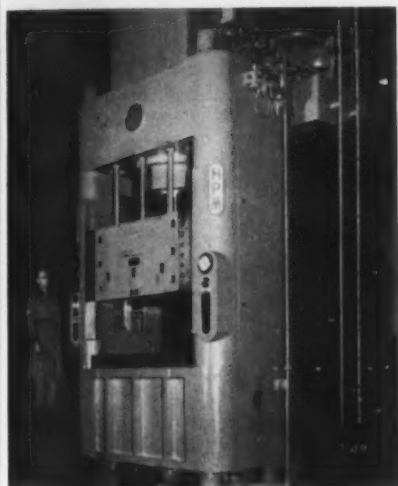
Continued from Page 40

iron on the backs of castings. Parts are riveted together for added structural strength, and hinges are made of aluminum. Insulation of the plate's working surface prevents bleeding of magnetism to surrounding areas. *Eriez Mfg. Co.*

For more data check No. 38 on postcard, p. 37.

All-Hydraulic Press

This 425-ton H-P-M self-contained, all-hydraulic press, built for deep drawing and forming operations in the farm machinery indus-



try, is a single action type with a 133-ton die cushion installed in the bed. The press has a 24-in. stroke and a pressing surface of 60x48 in. It is operated by the H-P-M closed circuit system that provides a fast cycle, constant drawing speed, smooth operation, shockless reversal and full protection from overload. *Hydraulic Press Mfg. Co.*

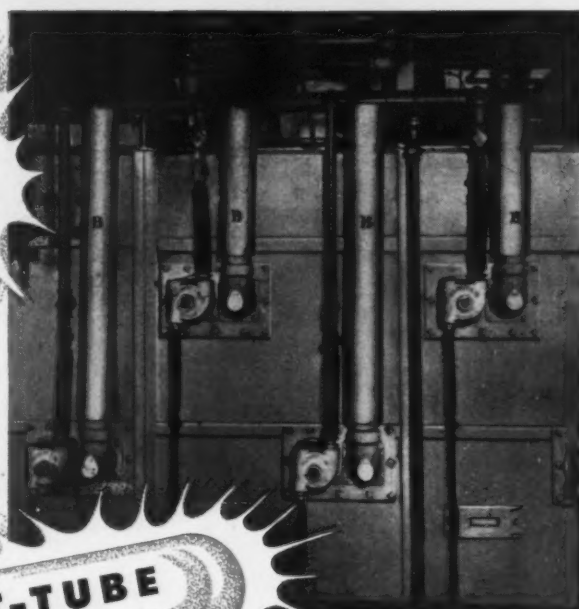
For more data check No. 39 on postcard, p. 37.

Infrared Oven

Two minutes of intense, zoned infrared heat in a conveyerized aerial electric radiant oven is said to provide rapid curing action and a hard, true color to synthetic

BLAZING THE HEAT TREAT TRAIL

The first Holcroft radiant-tube continuous furnace was built in 1936, and is still producing efficiently. The close-up at right shows the simplicity of the Holcroft radiant-tube installation.



RADIANT-TUBE HEATING

Applied by

Holcroft

for **LARGER FURNACE CAPACITY**
with **GREATER ECONOMY**

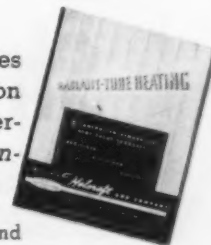
Radiant-tube heating of continuous furnaces has solved the problem of building larger, more durable furnaces for controlled-atmosphere heat treating.

As applied by Holcroft, this heating method offers the following advantages:

- Gas or electric firing may be used with the same tube assembly, permitting quick conversion without major overhaul.
- Holcroft burners are of *closed-head design*. Air and fuel are metered, and are progressively mixed as they pass through the tubes. This assures both maximum combustion efficiency and the uniform heating required for greatest tube life.
- The burner design permits *floating control*, with the same superior performance at all rates of heat input.
- All tubes are readily replaced without cooling the furnace; and electric heating elements are replaced without removing the tubes.

These are but typical of the many advantages provided by Holcroft leadership in production heat treat furnaces for *every purpose*—leadership based on *complete metallurgical and engineering service*. We invite your inquiries.

ILLUSTRATED BULLETIN covers design, advantages and applications of radiant-tube heating. May we send you a copy?



SINCE 1916



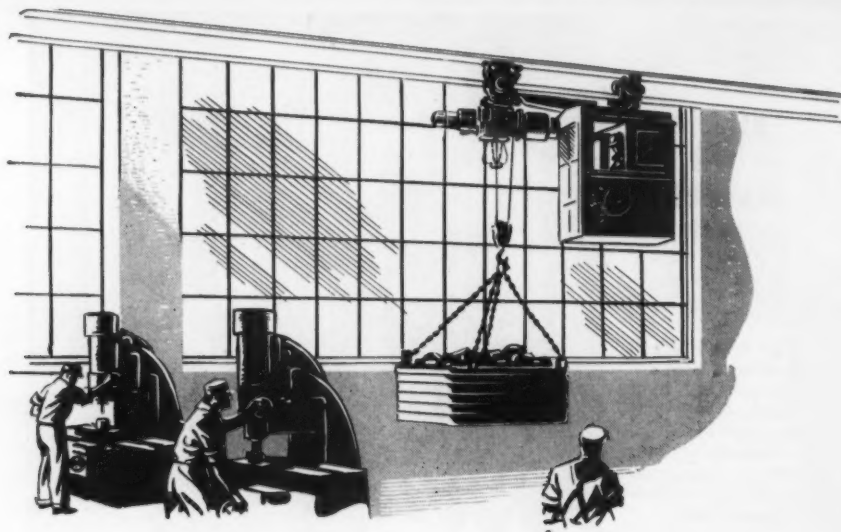
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4209 South Western Blvd.

6545 EPWORTH BLVD.
CLEVELAND 2
Wallace F. Schott
6516 Detroit St.

HOUSTON 1
R. E. McArdle
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For lowest-cost-per-load... *use dependable thru-the-air handling*

KEEP in mind these important advantages which "through-the-air" handling alone gives you. Unrestricted use of floor space, accurate spotting of work, higher stacking, greater dependability and safety, lower upkeep and longer life. On the production line or when storing or warehousing, they add up to worthwhile savings.

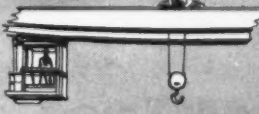
For a great many years, we have devoted our entire facilities to the manufacture of cab-operated and floor-controlled hoists, and overhead traveling cranes—and to laying out plant systems to make them the most efficient of all lifting and conveying tools.

May we show you pertinent data on installations similar to yours?

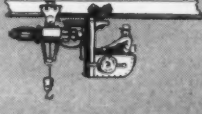
Shepard Niles

CRANE & HOIST CORPORATION

Makes and sells all three lifting tools for airborne shop loads



CRANES • Overhead



HOISTS • Cab Operated



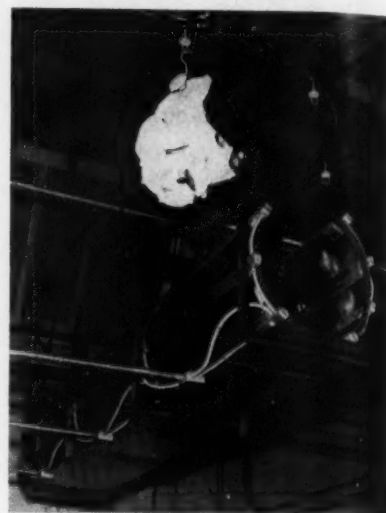
HOISTS • Floor Operated

356 SCHUYLER AVENUE • MONTAUR FALLS, N. Y.

NEW PRODUCTION IDEAS

Continued

enamel sprayed on gasoline engines. For maximum drying speed at the proper temperatures, three zones of heat are provided in the oven which is made up of three sections of 4-ft Chromalox electric radiant heaters. The first section through which the work passes is operated at full intensity for high



initial heat and to bring the material very rapidly to the best drying temperature. Heat tapers off in the last two sections. Twenty-one heaters rated at 230 v, 1800 w each comprise the 37.8 kw oven. Clearance inside the oven is 26 in., sufficient to handle two sizes of engines weighing 17 and 37 lb which are rotated as they pass through. Conveyor speed is constant at approximately 5½ fpm. *Edwin L. Wiegand Co.*

For more data check No. 40 on postcard, p. 37.

Power Fuse

A new current-limiting power fuse with an interrupting capacity of 100,000 amp is designed for applications on low-voltage circuits where the available short-circuit current is above the operating range of conventional National Electrical Code Standard fuses. The fuse is listed by Underwriters' Laboratories and is available in NECS standard cartridge fuses of 250 and 600v. Both voltage ratings have four basic cartridge sizes, 30, 60, 100 and 200 amp. The fuse is an insulated tube of mela-

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Today it's Roebling!

Why production men choose Roebling Cold Rolled Spring Steel

IT'S BEEN PROVED in plants the country over . . . that Roebling Cold Rolled Spring Steel saves preparation time on machines, minimizes machine stoppages, and cuts down the number of rejects. And this is only natural! Every inch of Roebling Spring Steel is identical in gauge, grain and finish . . . meets users' specifications with absolute uniformity.

Roebling Cold Rolled Spring Steel is available annealed, hard rolled untempered; scaleless tempered; tempered and polished; tempered, polished and strawed; or tempered, polished and blued.

Your Roebling Field Man will gladly help you choose the cold rolled spring steel, or round, flat or shaped wire, that will improve your product and your production. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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New York, 19 Rector St. ★ Philadelphia, 12 S. Twelfth St. ★ Portland, 1032 N. W.
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June 1, 1950

109

PUT IT TO WORK NOW!!

Electro's NEW GRINDING WHEEL for IRON

Put this new, resin bonded, abrasive-combination wheel to work now on your iron production. See it save 30% to 50% on abrasive costs alone. Test them for labor cost economy. They always equal the cost of compositions replaced and, very often, they show substantial labor cost savings. Because of the semi-resilience of their bond, they give better finish for all nominal grit sizing. Use them on floor stands, swing frames or portable machines. Test them at vitrified speed (6500 sfpm) or at resin speed (9500 sfpm). Send for details now. Say when and we'll demonstrate on your work in your plant. Also, if we may, we'll gladly send you free a copy of our Grinding Wheel Manual illustrated in full color. ELECTRO REFRACTORIES & ALLOYS CORPORATION, 344 Delaware Ave., Buffalo 2, N. Y.

Electro HIGH-SPEED GRINDING WHEELS

HIGH-SPEED
GRINDING WHEELS

CRUCIBLES

STOPPERS

High
Temperature
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REFRACTORIES
for Chemical
and Ceramic
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ELECTROCARB
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ABRASIVE GRAIN

NEW PRODUCTION IDEAS

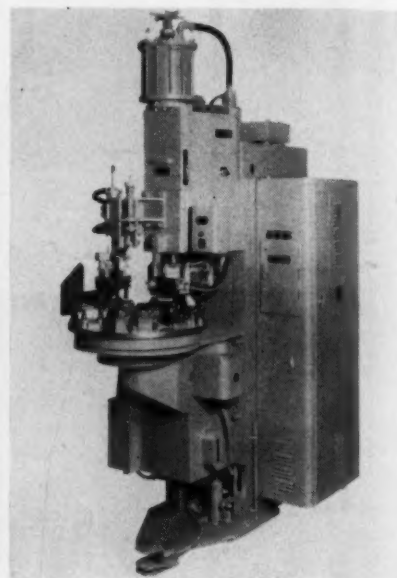
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mine impregnated fiber glass having high strength and resilience. Silver copper ferrules at each end fit NECS fuse holders. *General Electric Co.*

For more data check No. 41 on postcard, p. 37.

Projection Welder

The resistance projection welder illustrated is complete with motor driven Geneva indexing table, electrical controls and automatic air operated pick-off work ejector. With no current carrying bearings,



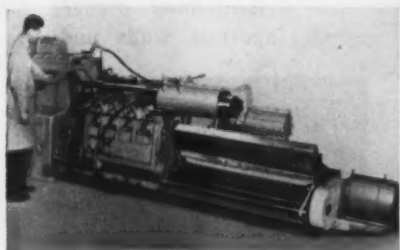
it is a dual ram type welder with five stations and ten dies. The machine projection-welds a mounting plate of 16 gage low carbon steel to a telephone part box of 18 gage low carbon steel, at production rate of 1600 assemblies per hr. Welding labor costs are said to be 25 pct of the previous rate. *Taylor-Winfield Corp.*

For more data check No. 42 on postcard, p. 37.

Semi-Automatic Lathe

Versatility and ease of change-over have been incorporated in a new semi-automatic Lo-Swing lathe that has large capacity for heavy multiple-tool turning. The front turning carriage may be equipped with two or more individually controlled, power operated cross slides which feed the tools into the cut. Tool cutting pressures are taken on large rolls, fitted to the bottom of each slide, that remains in con-

stant contact with the cross feed cam. Other new features include cam feed back-squaring attachments operating on an automatic cycle with pushbutton control; an adjustable stop for positioning the



carriage in relation to the starting point of the cut and automatic tool relief at the end of the cut. The lathe is designed to take advantage of sintered carbide tools having cutting capacity at high speeds and coarse feeds. *Seneca Falls Machine Co.*

For more data check No. 43 on postcard, p. 37.

Clamping Fixture

The Holdfast fold-away clamping fixture speeds body shop work. It has four universal clamping heads and telescoping arms and legs that are quickly adjustable to



accommodate parts of any size or contour. Parts are held fast in vise-like grip at any angle. The spread of the frame is 38x42 in.; working height, 28 to 46 in. The fixture collapses into a small, flat unit that can be hung up out of the way when not in use. *Complex Tool & Gage Co.*

For more data check No. 44 on postcard, p. 37.

Button Head Screws

Button head socket cap screws have thin heads that give clean lines and lower protuberance, said to be an advantage when countersinking for flat head screws or

The ABC of MST

A ALWAYS MAKES POSSIBLE
B BETTER PRODUCTS
C AT LOWER COST

Michigan
Electric Resistance
**WELDED
STEEL
TUBING**

ROUND

1/4" to 4" O. D. 9 to 22 gauge

SQUARE-RECTANGULAR

1/2" to 2" 20 gauge 1" to 2 3/4", 14, 16, 18 gauge

Can be Bent,

FLANGED, EXPANDED, TAPERED, DEPRESS BEADED, EXPAND BEADED, ROLLED, EXTERNAL UPSET, INTERNAL UPSET, SPUN CLOSED, FORGED, BEVEL FLANGED, FLATTENED, SWAGED, FLUTED.

Uniform

STRENGTH, WEIGHT, DUCTILITY, MACHINABILITY, WELDABILITY, I.D. and O.D.



Consult us for engineering and technical help in the selection of tubing best suited to your needs.

Thousands of products today—from the smallest "Gadget" to the largest—earn more profits because of the use of MICHIGAN WELDED STEEL TUBING. The quality and dependability of MICHIGAN TUBING make possible similar profits for manufacturers who have not as yet considered the design and fabrication advantages of welded steel tubing.

A Quality Product,
can be worked in your plant or prefabricated by MICHIGAN.

RESISTANCE WELDED STEEL TUBING

Michigan **STEEL TUBE** PRODUCTS CO.

THE OLDEST NAME IN ELECTRIC

33 Years in the Business

9450 BUFFALO STREET • DETROIT 12, MICHIGAN
FACTORIES: DETROIT, MICHIGAN • SHELBY, OHIO

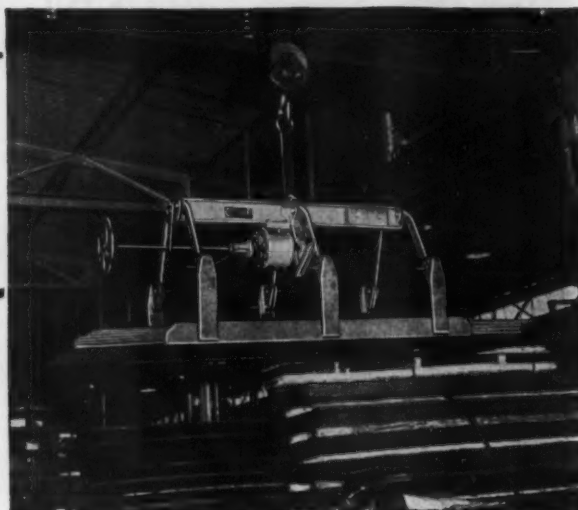
DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillsdale, N. J.—C. L. Hyland, Dayton, Ohio—Dirks & Company, Portland, Oregon—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—American Tubular & Steel Products Co., Pittsburgh, Pa.—Strong, Carlisle & Hammond Co., Cleveland, Ohio

June 1, 1950



Handle Sheets
with

C-F LIFTERS



Handle loose or bundled sheets with one of these C-F Lifters and you save TIME and SHEETS, because C-F Lifters, under one man end control, can handle more sheets per load safer, faster and more economically. Tong action grips loads tightly, yet design features like wide bearing surfaces give full protection to stock edges. End control of C-F Lifters permits closer stocking of piles—resulting in more efficient use of storage facilities.

C-F Lifters are available in capacities from 2 to 60 tons or larger, in standard or semi-special designs.

Write for the bulletin "C-F Lifters"

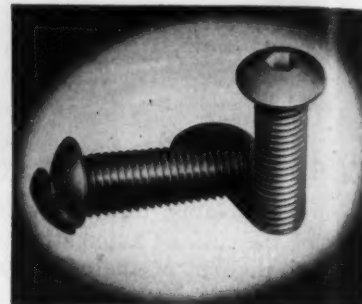
CULLEN-FRIESTEDT CO.
1303 S. Kilbourn Ave., Chicago 23, Ill.

HANDLE SHEETS
with
C-F LIFTERS

NEW PRODUCTION IDEAS

Continued

counterboring for standard pattern cap screws are impractical. Button heads retain the true hex shape, well defined corners and smooth taperless walls under re-

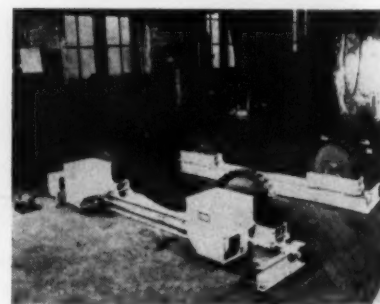


peated tightening and loosening operations. The screws are available in No. 8 to 5/8 in. diam; standard lengths 1/2 to 2 in. **Holo-Krome Screw Corp.**

For more data check No. 45 on postcard, p. 37.

Turning Rolls

TracTred turning rolls are designed for light gage tanks. The tank is supported uniformly up to 105° on the bottom side, the supporting medium being a roller chain with rubber tread shoes. Due to the large contacting area tanks may be smoothly and evenly rotated with no buckling or denting, it is stated. Rotation of the tank from



0 to 100 ipm is accomplished through an infinitely variable speed drive transmission with remote drum control. Rolls are adjustable for various size tanks. They have 10,000 lb capacity. **Aronson Machine Co.**

For more data check No. 46 on postcard, p. 37.

Straightening Machine

A new straightening machine, built for handling sheet metals in 18 gage or lighter sizes is designed for straightening, rolling, or form

You Can Depend on "HERCULES" (RED-STRAND) WIRE ROPE



Here is a Wire Rope with extra stamina that is built to give safe, dependable and economical service—even on the toughest jobs. As it is made in Round Strand and Flattened Strand constructions—Preformed and Non-Preformed—there is a correct type for every requirement.

We Invite Your Inquiries.

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
ESTABLISHED 1857

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N AGE

A REPUTATION BOUND WITH MILES OF SPIRAL WIRE

kokote
TRADE MARK REG. U.S. PAT. OFF.

● Have you ever noticed the spiral binding on your stenographer's notebook? Chances are, it's made of KOKOTE . . . an unusually bright steel wire with a chrome-like lustre. Because KOKOTE has a desirable degree of stiffness, it is used by one of our customers to make these wire bindings. Not only books, but this manufacturer's reputation—and ours—are inevitably bound with it. We feel, therefore, the greatest responsibility toward our customer and his wire-fabricating problems.

There is this kind of "family" relationship between Continental and the many manufacturers we supply with lustrous KOKOTE . . . whether they use our wire for spiral bindings, broom wire, or paper clips. We act in the belief that business success ultimately depends on SERVICE . . . so you'll always find us ready and willing to help you. If you are troubled by a particular problem, please feel free to write us, without obligation.



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STEEL**

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GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS OF Manufacturer's Wire in many sizes, shapes, tempers and finishes, including Galvanized,

KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire.

ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

PAGE WIRE

LOW CARBON
HIGH CARBON
STAINLESS
SPECIAL ALLOY
ARMCO IRON

ROUND

FLAT

OR

SHAPED

**You draw the Shape
—Page can draw the Wire**

—the way you want it for your production—whether it's ALL of your product, or only a part.

Cross-sectional areas up to .250" square; widths to $\frac{3}{8}$ "; width-to-thickness ratio not exceeding 6 to 1.

**for Wire or
Information about Wire—**

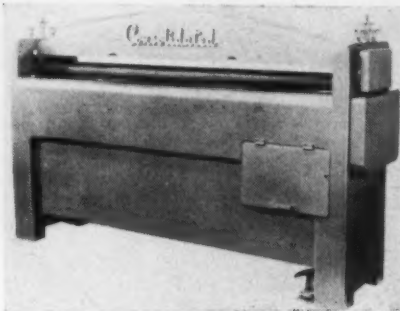
*Get in touch
with Page!*



NEW PRODUCTION IDEAS

Continued

rolling of stainless steel sheet, aluminum, zinc, copper, cold rolled and hot rolled steel. It is made in three sizes for sheets up to 36, 60 and 72 in. wide. Built with five



rollers, the machine is said to be adjusted quickly for different materials and types of rolling. A variable speed transmission permits synchronizing the speed for production work. *Consolidated Equipment Co.*

For more data check No. 47 on postcard, p. 37.

Drilling Machine

A new Electron drill said to perform at a record speed is a motor driven automatic hard metal drilling machine. The drill was designed for production cutting of



extremely small as well as large holes in hardened metals and for production removal of taps, drills and reamers. Drilling is a continuous process for the full length of the electrode used. The Electron drill has a 2 kva rating and operates on a 110 v, 60 cycle line. *Elox Corp. of Michigan.*

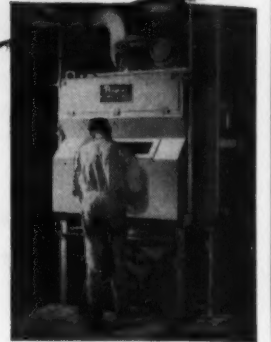
For more data check No. 48 on postcard, p. 37.

Resume Your Reading on Page 41

At Fred Heinzelman & Sons
NEW YORK, N.Y.

**Pangborn Hydro-Finish
CUTS HAND POLISHING
OF DIES 60%**

reports Mr. J. L. Crosby,
General Manager



Shown here is the Pangborn Hydro-Finish unit which set new records at Fred Heinzelman & Sons. A pioneer of heat treated dies, the company reports: Hydro-Finish removes heat treat oxide discoloration, cuts hand polishing 60% to 70%, holds tolerances to a precision .0001"

**Find out how
HYDRO-FINISH
can save you money**

Hydro-Finish is the answer to modern cleaning, decorating and finishing problems. As Fred Heinzelman & Sons have found, Hydro-Finish virtually eliminates tedious and expensive hand buffing and polishing on tool and die maintenance. Now, dies with heavy oxide discolorations can be cleaned faster and at lower cost.

And, on the production line, Hydro-Finish assures better bonding, electroplating, painting—gives you *the surface you want* within .0001" with no pits, grooves or hard-to-clean imperfections left after cleaning.

For full information on the many ways Hydro-Finish can save you money, write today for Bulletin 1400 to: PANGBORN CORPORATION, 1201 Pangborn Blvd., Hagerstown, Md.

Pangborn

BLAST CLEANS CHEAPER

with the right equipment for every job

MARKET

IRON AGE
FOUNDED 1855
MARKETS & PRICES

Briefs and Bulletins

orders increase—Large industrial tank manufacturers report an increase in the number of orders received during the last month. Their products, tied in mostly with oil industry expansion, received a setback last year when some of the big oil companies cut expansion 18 pct. Now the oil companies are stepping up expansion again. Some of these tank makers are unable to take time to try to diversify their distribution because they couldn't take new orders if they found them.

wait—Mills hold out little hope for any early improvement in the steel supply situation. Some are telling their customers that second quarter deliveries will probably be extended into the third quarter. Deliveries are lagging 3 to 6 weeks behind schedule.

price rises—The price of carbon steel forging billets was lifted by the Rotary Electric Steel Co. from \$63 to \$66 a ton. McLouth Steel Corp.'s cold-rolled strip went up to \$4.95 per 100 lb; hot rolled strip to \$4.05; and hot rolled sheet to \$4.15, all showing 60c per 100 lb gains.

aluminum products—The new adjustments in aluminum products prices include 1c per lb lower prices on roofing sheet, flat and coiled. This reduction is applicable only to shipment out of mill. A new price break has been established between mill and warehouse shipments.

where's it going?—Warehouses claim that demand for stainless steel products is higher than ever before. And stainless producers are inclined to agree with them. But the question neither can answer is where is all the stainless going?

quick selling—Warehouses report a small build-up in their inventories of galvanized sheets, including the light gages. The demand for galvanized hertofore has been so heavy that warehouses have been shipping to customers almost out of railroad cars.

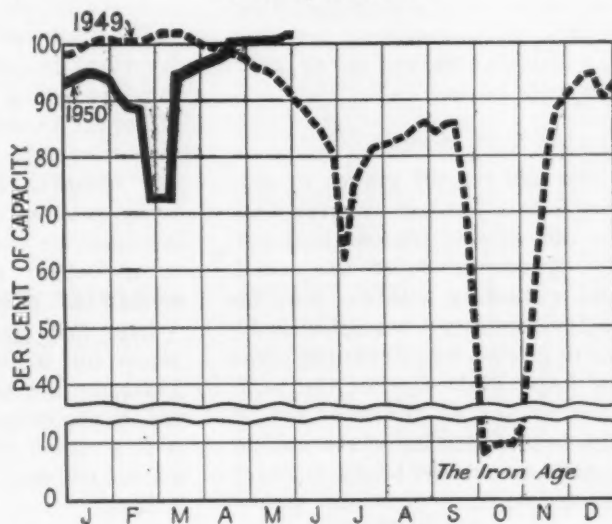
plate advance—Carbon steel plates were advanced \$7 a ton by Central Iron & Steel Co., Harrisburg, Pa., effective June 1. The higher price is attributed to the rapidly rising steel scrap market.

warehouse prices—Joseph T. Ryerson & Son, Inc., of New York, announced new warehouse base prices on some products effective with shipments on May 22. The adjusted price on structural shapes, metropolitan New York, per 100 lb, base-2000/9999 lb, was \$5.85. Others included: hot rolled bars and bar shapes, \$5.95, and hot rolled plates, \$6.10.

tight plates—The tight plate situation threatens to become worse because of the recent 10,000 freight car order by Pennsylvania RR. It is expected that the shortage of plate will hold car production down in July. Recent inquiries indicate that more big orders might be on the way.

liquid chlorine—The Diamond Alkali Co. announces an increase in prices of liquid chlorine in single and multi-unit tank cars, with nine quantity differentials for shipments in ton containers. The new price in single unit tank cars will be \$2.55 per cwt, f.o.b. Diamond's plants at Painesville, Ohio, Baldwin, Ark., and Houston, Texas.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
May 21	104.5*	105.6	96.0*	88.0	98.0*	104.0	109.5	104.0	104.0	99.5	92.0	91.0	112.0	101.5
May 28	104.0	105.0	94.5	88.0	95.0	104.0	109.5	104.0	104.0	102.0	92.0	91.0	112.0	101.5

* Revised.

Nonferrous Metals OUTLOOK

Market Activities

Shortages of zinc and copper point to higher prices . . .

Copper scrap prices move up . . . Alcoa reduces roofing sheet 1¢ . . . Cadmium market strong



by

John Anthony

New York—Buyers were hard put to place business in copper and zinc last week. The whole metal picture was very strong. The zinc market advanced another ½¢ last Wednesday, bringing the price to 12.50¢ East St. Louis, a higher price than at any time since May 9 last year. There were indications in the market that a still higher price was in the offing. Sellers were unwilling to place any business except on an average price basis.

Copper Tariff Moves

Demand for all grades of zinc was heavy, but buyers were finding difficulty in placing business. The Munitions Board has scheduled a meeting with the Zinc Industry Advisory Committee in order to discuss its stockpiling plans for fiscal 1951. One of the principal causes of the shortage of zinc is the addition of stockpiling demand to current heavy industry requirements.

Nearby copper is not obtainable in the market. June metal has all been placed. July copper is short of the market's requirements.

Developments in the copper tariff battle are moving rapidly now. Domestic mining interests have lost ground due to the advancing market even with current heavy imports. But consumers could lose the

suspension battle in the parliamentary skirmishes.

The brass mills are closing down for vacation periods in July, but they are asking for good tonnages of copper to make up for smaller deliveries than wanted in the last few months. Foreign copper is being sold with the duty, if reimposed, for the buyer's account. Scrap copper and brass is not moving to refineries and mills.

Late last week higher buying prices for scrap copper appeared. This may not be effective in freeing up the movement of scrap, but it is a tip-off of a coming copper market advance under current conditions.

The lead market was moving along last week at a moderate rate as buyers built up their inventories. The munitions board has no plans to buy for the stockpile for the second half of the year. Metal is freely available for nearby delivery. There is no indication of a higher lead price in the immediate future.

NONFERROUS METALS PRICES

	May 24	May 25	May 26	May 27	May 29
Copper, electro, Conn.	20.50	20.50	20.50	20.50	20.50
Copper, Lake, Conn.	20.625	20.625	20.625	20.625	20.625
Tin, Straits, New York	78.50	78.25	78.00	....	*78.125
Zinc, East St. Louis	12.50	12.50	12.50	12.50	12.50
Lead, St. Louis	11.80	11.80	11.80	11.80	11.80

Note: Quotations are going prices.
* Tentative.

The Aluminum Co. of America has put into effect a price reduction in flat and coiled roofing sheet, 1¢ per lb for mill shipments. Shipments out of warehouse will take a higher price. The full list of price revisions by Alcoa to date includes — flat and coiled sheets and circle, up ½¢ per lb; plate up 1¢; foil, except household foil, up 1¢; drawn tubing, up ½¢; extruded tubing, for diameters up to 9 in, up ½¢; rod, screw machine stock and drawn wire, up ½¢.

Tin Market Coasts

The tin market idles along with little change in price, principally reflecting transactions on the Singapore market. Business in the domestic market is rather light.

Demand for metals has strengthened the cadmium market. Only a month ago the interest in the metal was quite limited and there was a good possibility of a price drop. Cadmium production is small.

MILL PRODUCTS

Aluminum

(Base prices, cents per pound, base 30,000 lb., f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 27.4¢; 4S, 61S-O, 29.3¢; 52S, 31.4¢; 24S-O, 24S-OAL, 30.8¢; 76S-O, 76S-OAL, 36.8¢; 0.081 in., 2S, 3S, 28.4¢; 4S, 61S-O, 30.7¢; 52S, 32.8¢; 24S-O, 24S-OAL, 31.4¢; 76S-O, 76S-OAL, 38.5¢; 0.032 in., 2S, 3S, 30.0¢; 4S, 61S-O, 34.0¢; 52S, 36.7¢; 24S-O, 24S-OAL, 38.4¢; 76S-O, 76S-OAL, 48.1¢.

Plate: ¼ in., and heavier: 2S, 3S, F, 24.8¢; 4S-F, 27¢; 52S-F, 28.1¢; 61S-O, 27.6¢; 24S-F, 24S-FAL, 28.1¢; 76S-F, 76S-FAL, 34.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 64¢; 11 to 13, 34.6¢ to 76¢; 23 to 25, 36.7¢ to 11.05¢; 35 to 37, 44¢ to \$1.53; 47 to 49, 63.5¢ to \$2.20.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 34.5¢ to 31¢; Cold-finished, 0.375 to 3 in., 2S, 3S, 37¢ to 32.5¢.

Screw Machine Stock: Rounds, 11S-T3, R317-T4, ¼ to 1 1/32 in., 49.5¢ to 38.5¢; ¾ to 1 ½ in., 88¢ to 36¢; 1 9/16 to 3 in., 36¢ to 33¢; 17S-T4 lower by 1¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 36.5¢ to 27¢; 52S, 44.5¢ to 32.5¢; 56S, 47.5¢ to 39¢; 17S-T4, 60.5¢ to 36¢; 61S-T4, 45¢ to 34.5¢; 76S-T4, 76.5¢ to 55.5¢.

Extruded Tubing, Rounds: 63S-T5; OD in in., 1 ½ to 2, 33.5¢ to 49¢; 2 to 4, 30.5¢ to 41.3¢; 4 to 6, 31¢ to 37.8¢; 6 to 9, 31.5¢ to 39.3¢.

Roofing Sheet, Flat: 0.019 in. x 28 in., per sheet, 72 in., \$1.008; 96 in., \$1.344; 120 in., \$1.679; 144 in., \$2.017. Gage 0.024 in. x 28 in., 72 in., \$1.224; 96 in., \$1.633; 120 in., \$2.042; 144 in., \$2.451. Coiled Sheet: 0.019 in. x 28 in., 24.7¢ per lb.; 0.024 in. x 28 in., 23.7¢ per lb.

Magnesium

(Cents per lb., f.o.b. mill, freight allowed)

Sheets and Plate: M, FSA, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 60¢-65¢; 14, 60¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-1.01¢; 22, \$1.22-\$1.31; 24, \$1.62-\$1.75. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.811, 58¢; ½ to ¾, 46¢; 1 to 1.749, 43¢; 2 to 5, 41¢. Other alloys higher. Base: Up to ¼ in. diam., 10,000 lb.; ¾ in. to 1 ½ in., 20,000 lb.; 1 ½ in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangle: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 2.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 42¢. Other alloys higher. Base, in weight per ft of shape: Up to ¼ lb, 10,000 lb; ½ lb to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam. in., 0.049 to 0.057, ¼ to 5/16, \$1.14; 5/16 to ¾, \$1.02; ¾ to 1, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ¾ to 7/16, 85¢; ¾ to 1, 82¢; 1 to 2 in., 57¢; 0.165 to 0.219, ¾ to 1, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher. Base, OD in in.: Up to 1 ½ in., 10,000 lb; 1 ½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Nickel and Monel

(Base prices, cents per lb., f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and bars	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	40	40

Copper, Brass, Bronze

(Cents per lb., freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	35.43		35.03
Copper, h-r		31.28	
Copper, drawn		32.53	
Low brass	33.42	33.11	
Yellow brass	32.03	31.72	
Red brass	33.89	33.58	
Naval brass	36.71	30.77	32.03
Lead brass		26.43	30.49
Com'l bronze	34.88	34.57	
Manganese bronze	40.21	34.10	35.66
Phosphor bronze	53.17	53.42	
Muntz metal	34.93	30.49	31.74
Everdur, Hercu-loy, Olym-ple, etc.	40.14	39.08	
Nickel silver			
10 pct	42.77	46.63	49.71
Arch. bronze			30.49

PRIMARY METALS

(Cents per lb., unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	17.50
Aluminum pig	16.50
Antimony, American, Laredo, Tex.	24.50
Beryllium copper, 3.75-4.25% Be	
dollars per lb contained Be	\$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	\$56.00
Bismuth, ton lots	\$2.00
Cadmium, del'd	\$2.00
Cobalt, 97-99% (per lb)	\$1.80 to \$1.87
Copper, electro, Conn. Valley	20.50
Copper, Lake, Conn. Valley	20.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$100 to \$110
Lead, St. Louis	11.80
Lead, New York	12.00
Magnesium, 99.8+%, f.o.b. Freeport Tex., 10,000 lb	20.50
Magnesium, sticks, 100 to 500 lb	
36¢ to 38¢	
Mercury, dollars per 76-lb flask	
f.o.b. New York	\$70 to \$73
Nickel, electro, f.o.b. New York	42.97
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	36.25
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$66 to \$69
Silver, New York, cents per oz.	72.75
Tin, New York	78.50
Zinc, East St. Louis	12.50
Zinc, New York	13.22
Zirconium copper, 50 pct	\$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carload)

85-5-5-5 ingot	
No. 115	19.00-19.25
No. 120	18.50-18.75
No. 123	18.00-18.25
80-10-10 ingot	
No. 305	22.75
No. 315	20.75
88-10-2 ingot	
No. 210	28.75
No. 215	26.25
No. 245	21.00-22.00
Yellow ingot	
No. 405	16.25-17.00
Manganese bronze	
No. 421	21.25

Aluminum Ingot

(Cents per lb., of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	19.25-19.75
0.60 copper, max.	19.00-19.50
Piston alloys (No. 122 type)	17.50-18.00
No. 12 alum. (No. 2 grade)	17.00-17.50
108 alloy	17.50-17.75
195 alloy	18.25-18.75
13 alloy	19.25-19.75
AXS-679	17.50-18.00

Steel deoxidizing aluminum, notch-bar

	granulated or shot
Grade 1—95-97 ½ %	18.50-19.00
Grade 2—92-95 %	17.50-18.00
Grade 3—90-92 %	16.50-17.00
Grade 4—85-90 %	16.00-16.50

ELECTROPLATING SUPPLIES

Anodes
(Cents per lb., freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37 ½
Electrodeposited	31 ½
Rollod, oval, straight, delivered	35.34
Forged ball anodes	39
Brass, 80-20	
Cast, oval, 15 in. or longer	32 ¾
Zinc, oval	19 ½
Ball anodes	18 ½
Nickel 99 pct plus	
Cast	59.00
Rollod, depolarized	60.00
Cadmium	\$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz., f.o.b. Bridgeport, Conn.	79 ½

Chemicals

	(Cents per lb., f.o.b. shipping point)
Copper cyanide, 100 lb drum	49 ½
Copper sulfate, 99.5 crystals, bbl.	10 ½
Nickel salts, single or double, 4-100 lb bags, frt allowed	18.00
Nickel chloride, 375 lb drum	25.00
Silver cyanide, 100 oz lots, per oz.	61 ½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, 89 pct granular	7.15
Zinc cyanide, 100 lb drums	43 ½

SCRAP METALS

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy Turn- ings
Copper	17 ½ 16 ¾
Yellow brass	14 ½ 13 ¾
Red brass	16 15 ½
Commercial bronze	16 ½ 15 ½
Manganese bronze	13 ¾ 13
Leaded brass rod ends	14 ¾

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	17.50
No. 2 copper wire	16.50
Light copper	15.50
Refinery brass	16.50*
Radiators	11.25

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	17.50
No. 2 copper wire	16.50
Light copper	15.50
No. 1 composition	14.75
No. 1 comp turnings	14.25
Rollod brass	12.00
Brass pipe	13.50
Radiators	11.75
Heavy yellow brass	11.25-11.50

Aluminum

Mixed old cast	10.00-10.25
Mixed old clips	10.75-11.00
Mixed turnings, dry	10.00-10.25
Pots and pans	10.00-10.25
Low copper	11.75-12.00

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	16 ½ -16 ¾
No. 2 heavy copper and wire	15 -15 ½
Light copper	14 -14 ½
Auto radiators (unsweated)	10 ½ -10 ¾
No. 1 composition	13 -13 ½
No. 1 composition turnings	12 ½ -12 ¾
Clean red car boxes	11 -11 ½
Cocks and faucets	11 -11 ½
Mixed heavy yellow brass	9 -9 ½
Old rolled brass	10 ½ -10 ¾
Brass pipe	11 ½ -11 ¾
New soft brass clippings	12 ½ -13
Brass rod ends	11 ½ -11 ¾
No. 1 brass rod turnings	11 -11 ½

Aluminum

Alum. pistons and struts	5 ½ -6
Aluminum crankcases	8 -8 ½
2S aluminum clippings	11 -11 ½
Old sheet and utensils	8 -8 ½
Borings and turnings	5
Misc. cast aluminum	8 -8 ½
Dural clips (24S)	8 -8 ½

Zinc

Now zinc clippings	8 ½ -8 ¾
Old zinc	6 -6 ½
Zinc routings	4 -4 ½
Old die cast scrap	4 ½ -4 ¾

Nickel and Monel

Pure nickel clippings	24 -25
Clean nickel turnings	18 -19
Nickel anodes	24 -25
Nickel rod ends	23 -24
New Monel clippings	14 -15
Clean Monel turnings	8 -9
Old sheet Monel	11 ½ -12 ½
Old Monel castings	9 -10
Inconel clippings	13 -15
Nickel silver clippings, mixed	9 -10
Nickel silver turnings, mixed	6 -7

Lead

Soft scrap, lead	9 ¾ -10
Battery plates (dry)	5 -5 ½

Magnesium

Segregated solids	9 -10
Castings	5 ½ -6 ½

Miscellaneous

Block tin	60 -62
No. 1 pewter	41 -43
No. 1 auto babbitt	37 -39
Mixed common babbitt	9 ½ -10
Solder joints	12 ½ -13
Siphon tops	37 -39
Small foundry type	13 -13 ½
Monotype	11 ½ -12
Lino. and stereotype	11 -11 ½
Electrotype	9 ½ -10
New type shell cuttings	13 -13 ½
Hand picked type shells	6 ½ -7
Lino. and stereo. dross	4 ½ -4 ¾
Electro. dross	2 ½ -3

MARKETS—PRICES—TRENDS



SCRAP

Iron & Steel

Steel Grades Soar in Wild Market

The sharpest price advances in recent history marked a frenzied market this week. In some places THE IRON AGE quotations were raised on an appraisal of all factors. But there were enough genuine sales in other markets throughout the country to show the terribly strong tone of steelmaking scrap prices. To many, the outlook is alarming.

In Pittsburgh one broker flatly turned down a 10,000-ton order at \$42.00, fearing it would be bad before he got back to the office. He may have been thinking of a recent sale of the same tonnage at \$43.00 in Cleveland, which is normally several dollars a ton below the Pittsburgh price.

Causes of the zany market include: (1) Prospective allocation of scrap direct from consumers to mills; (2) cross raiding of markets; (3) desperate covering by shorts; and (4) efforts to tie up scrap for conversion deals. The heavy steel melt would firm prices but could not alone account for the enormous price jumps being chalked up every week.

PITTSBURGH—No. 1 heavy melting steel jumped \$3.50 per ton to \$42.50, top. One consumer described the market as out of hand, with reported purchases of \$40 and up. The consensus is that the market has not yet reached its peak. The mills are offering at least token resistance to higher prices, but some are willing to admit that at the rate furnaces are eating up the scrap they can't afford to hold out for long. With prices based largely on what was paid for the last list, quotations on railroad grades were strictly nominal.

CHICAGO—The scrap market continued advancing upward in the Chicago area this week with some quarters predicting a \$40 price for No. 1 heavy melting steel in the near future. The price of No. 1 heavy melting jumped \$3 per gross ton this week to a top of \$38. Turnings were up 50¢ to \$1. The high operating rate and booming conversion deals are keeping the steam under the market.

PHILADELPHIA—The scrap market was under strong pressure last week from higher prices in other districts. Prices of steel grades were advanced by \$3 a ton. Brokers were covering on old orders. Good tonnages were in demand, but mills were still limiting bundles. Turnings were up \$1.50 to \$2; low phos was up \$1. Carwheels and malleable were up another \$1, but other cast grades were held down by the price of foreign pig iron offers. The run-away steel scrap market can be attributed to heavy conversion demand.

NEW YORK—The market here was in a state of confused turmoil early this week. No tonnages were being offered to

brokers; dealers with quantities are holding out for more price increases. Steel-making grades continued strong; turnings were up \$2.50, and the cast market finally scored increases of \$1 for No. 1 and 50¢ in the other grades.

DETROIT—There is practically unanimous agreement here that this is the zaniest scrap market on record. The combined effect of (1) prospective scrap allocations, (2) raids on local markets by outside firms, (3) desperate covering by brokers short in the market and (4) efforts to tie up scrap possibly needed to swing conversion deals has sent prices upward from \$2 to \$5 per ton. No. 1 bundles continue hot, dragging the rest of the market along.

CLEVELAND—Purchase of a representative tonnage of No. 1 heavy melting steel here by a major consumer blew the Cleveland-Valley scrap market wide open this week. The trade is baffled by the speed at which this market has advanced. Buyers are afraid of putting out a cheap order and brokers are hesitating to take an order of any kind. Primary strength of the market is still in the No. 1 and premium grades, but good dealer market is running close behind. No small factor in this market is the terrific short interest, making this market one of the wildest in the history of the business.

ST. LOUIS—Openhearth grades are up again this week \$1 a ton. Shoveling turnings are up \$4 to \$5 on buying by a chemical manufacturer. Advances are due to buying from other markets, the steel mills having made previous heavy commitments. The melt has been heavy and it is expected that local plants will come into the market next week.

CINCINNATI—Prices advanced \$2.50 a gross ton on No. 1 heavy melting grades here in a wide-open market as district consumers proved a willingness to meet competition and prevent tonnage from moving out of this district. Demand for foundry grades is limited but steady. Blast strength of this market is still in the No. 1 grades and limited tonnages of turnings are moving to other districts.

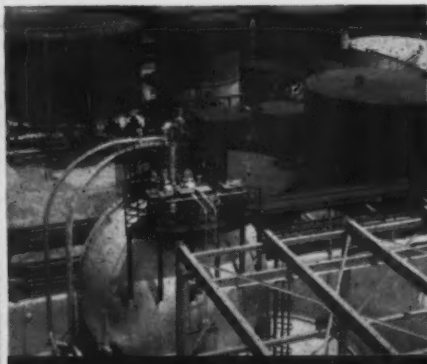
BOSTON—Prices were up by as much as \$3.50 a ton in a sizzling market here. Brokers report "lots of business" but there is still a lot of covering of old orders. Some say things are more frenzied now than they were in 1948. All steelmaking grades shared in the advance. Cast was still fairly dull, though No. 1 grades were \$1 a ton higher while other cast material was hanging heavy on the market.

BIRMINGHAM—Scrap trading is limited here but the price undertone is very strong. Buyers are attempting to keep prices down and sellers are holding back in anticipation of further advances. Scrap that usually comes to Birmingham from nearby states is being shipped to out of district points where prices are higher.

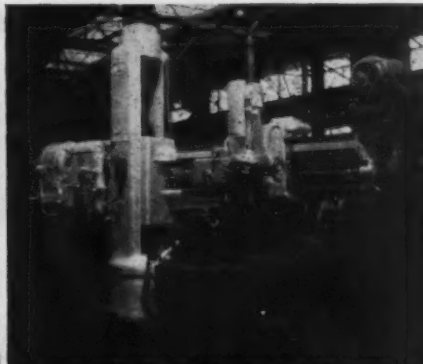
BUFFALO—Additional advances of \$2.00 to \$3.00 a ton were posted on steel-making grades in line with prices in other areas. No. 1 heavy melting reached \$36.00-\$37.00 a ton as dealers reported prices being paid for material in this section by outside sources substantiated a \$3.00 boost. Other steelmaking grades moved up accordingly. Cast scrap jumped \$2.00 a ton. Mill consumers refused to enter the market. They were supported in their stand by huge reserve stocks and a sustained influx of scrap by boat.



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AGE

Pittsburgh

No. 1 hvy. melting	\$42.00 to \$42.50
No. 2 hvy. melting	37.00 to 37.50
No. 1 bundles	42.00 to 42.50
No. 2 bundles	31.00 to 31.50
Machine shop turn.	29.50 to 30.00
Mixed bor. and ms. turns	29.50 to 30.00
Shoveling turnings	31.50 to 32.00
Cast iron borings	30.50 to 31.00
Low phos. plate	44.00 to 44.50
Heavy turnings	37.00 to 38.00
No. 1 RR. hvy. melting	43.00 to 43.50
Scrap rails, random lgth.	42.00 to 42.50
Rails 2 ft and under	44.50 to 45.00
RR. steel wheels	42.00 to 42.50
RR. spring steel	42.00 to 42.50
RR. couplers and knuckles	42.00 to 42.50
No. 1 machinery cast	42.50 to 43.00
Mixed yard cast	37.00 to 37.50
Heavy breakable cast	34.00 to 35.00
Malleable	40.00 to 41.00

Chicago

No. 1 hvy. melting	\$37.00 to \$38.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 factory bundles	36.00 to 37.00
No. 1 dealers' bundles	35.00 to 36.00
No. 2 dealers' bundles	31.00 to 32.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	24.00 to 25.00
Low phos. forge crops	39.00 to 40.00
Low phos. plate	38.00 to 39.00
No. 1 RR. hvy. melting	38.00 to 39.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	50.00 to 51.00
Rails 2 ft and under	48.00 to 49.00
Locomotive tires, cut	44.00 to 45.00
Cut bolsters & side frames	40.00 to 41.00
Angles and splice bars	43.00 to 44.00
RR. steel car axles	52.00 to 53.00
RR. couplers and knuckles	41.00 to 42.00
No. 1 machinery cast	47.00 to 48.00
No. 1 agricul. cast	44.00 to 45.00
Heavy breakable cast	37.00 to 38.00
RR. grate bars	37.00 to 38.00
Cast iron brake shoes	37.00 to 38.00
Cast iron car wheels	39.00 to 40.00
Malleable	44.00 to 45.00

Philadelphia

No. 1 hvy. melting	\$31.50 to \$32.50
No. 2 hvy. melting	29.50 to 30.50
No. 1 bundles	31.50 to 32.50
No. 2 bundles	26.00 to 27.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	23.00 to 24.00
Low phos. punchings, plate	34.00 to 35.00
Low phos. 5 ft and under	34.00 to 35.00
Low phos. bundles	32.50 to 33.50
Hvy. axle forge turn.	31.50 to 32.50
Clean cast chem. borings	29.00 to 30.00
RR. steel wheels	35.00 to 36.00
RR. spring steel	35.00 to 36.00
Rails 18 in. and under	43.00 to 44.00
No. 1 machinery cast	38.00 to 39.00
Mixed yard cast	33.00 to 34.00
Heavy breakable cast	35.00 to 36.00
Cast iron carwheels	40.00 to 41.00
Malleable	43.00 to 44.00

Cleveland

No. 1 hvy. melting	\$42.50 to \$43.00
No. 2 hvy. melting	37.50 to 38.00
No. 1 busheling	42.50 to 43.00
No. 1 bundles	42.50 to 43.00
No. 2 bundles	32.50 to 33.00
Machine shop turn.	26.50 to 27.00
Mixed bor. and turn.	29.50 to 30.00
Shoveling turnings	29.50 to 30.00
Cast iron borings	29.50 to 30.00
Low phos. 2 ft and under	43.50 to 44.00
Steel axle turn.	40.50 to 41.00
Drop forge flashings	42.50 to 43.00
No. 1 RR. hvy. melting	42.50 to 43.00
Rails 3 ft and under	48.00 to 49.00
Rails 18 in. and under	49.00 to 50.00
No. 1 machinery cast	47.00 to 48.00
RR. cast	47.00 to 48.00
RR. grate bars	35.00 to 36.00
Stove plate	39.00 to 40.00
Malleable	45.00 to 46.00

Youngstown

No. 1 hvy. melting	\$44.50 to \$45.00
No. 2 hvy. melting	39.50 to 40.00
No. 1 bundles	44.50 to 45.00

Iron and Steel

SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

No. 2 bundles	\$34.50 to \$35.00
Machine shop turn.	33.50 to 34.00
Shoveling turnings	35.50 to 36.00
Cast iron borings	35.50 to 36.00
Low phos. plate	45.50 to 46.00

Buffalo

No. 1 hvy. melting	\$36.00 to \$37.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 busheling	33.00 to 34.00
No. 1 bundles	35.00 to 36.00
No. 2 bundles	31.00 to 32.00
Machine shop turn.	28.00 to 29.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	28.00 to 29.00
Low phos. plate	38.00 to 39.00
Scrap rails, random lgth.	40.50 to 41.00
Rails 2 ft and under	43.50 to 44.00
RR. steel wheels	42.50 to 43.00
RR. spring steel	42.50 to 43.00
RR. couplers and knuckles	42.50 to 43.00
No. 1 machinery cast	40.00 to 40.50
No. 1 cupola cast	38.00 to 39.00
Stove plate	36.00 to 37.00
Small Indus. malleable	40.00 to 41.00

Birmingham

No. 1 hvy. melting	\$30.50 to \$31.00
No. 2 hvy. melting	27.00 to 27.50
No. 2 bundles	25.00 to 25.50
No. 1 busheling	30.50 to 31.00
Machine shop turn.	23.00 to 23.50
Shoveling turnings	24.50 to 25.00
Cast iron borings	21.00 to 21.50
Bar crops and plate	33.00 to 33.50
Structural and plate	33.00 to 33.50
No. 1 RR. hvy. melt.	31.50 to 32.00
Scrap rails, random lgth.	35.50 to 36.00
Rerolling rails	41.50 to 42.00
Rails 2 ft and under	37.50 to 38.00
Angles & splice bars	37.00 to 38.00
Std. steel axles	32.00 to 33.00
No. 1 cupola cast	35.00 to 36.00
Stove plate	30.50 to 31.50
Cast iron carwheels	30.00 to 31.00

St. Louis

No. 1 hvy. melting	\$34.00 to \$35.00
No. 2 hvy. melting	30.00 to 31.00
No. 2 bundled sheets	29.00 to 30.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	26.00 to 28.00
Rails, random lengths	39.00 to 40.00
Rails 3 ft and under	43.00 to 45.00
Locomotive tires, uncut	37.00 to 38.00
Angles and splice bars	40.00 to 41.00
Std. steel car axles	50.00 to 52.00
RR. spring steel	40.00 to 41.00
No. 1 machinery cast	39.00 to 41.00
Hvy. breakable cast	33.00 to 35.00
Cast iron brake shoes	35.00 to 36.00
Stove plate	33.00 to 34.00
Cast iron car wheels	38.00 to 39.00
Malleable	38.00 to 40.00

New York

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$31.50 to \$32.00
No. 2 hvy. melting	25.50 to 26.00
No. 2 bundles	24.00 to 24.50
Machine shop turn.	18.50 to 19.00
Mixed bor. and turn.	18.50 to 19.00
Shoveling turnings	20.50 to 21.00
Clean cast chem. bor.	23.00 to 24.00
No. 1 machinery cast	31.00 to 31.50
Mixed yard cast	28.50 to 29.00
Charging box cast	30.00 to 30.50
Heavy breakable cast	30.00 to 30.50
Unstrp. motor blocks	21.50 to 22.00

Boston

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$29.50 to \$30.50
No. 2 hvy. melting	23.00 to 23.50
No. 1 bundles	29.50 to 30.50

No. 2 bundles	\$21.50 to \$22.50
Machine shop turn.	17.00 to 17.50
Mixed bor. and turn.	17.00 to 17.50
Shoveling turnings	19.00 to 20.00
No. 1 busheling	27.00 to 28.00
Clean cast chem. borings	20.50 to 21.00
No. 1 machinery cast	30.00 to 31.00
No. 2 machinery cast	26.50 to 27.00
Heavy breakable cast	25.00 to 26.00
Stove plate	25.00 to 26.00

Detroit

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$36.00 to \$37.00
No. 2 hvy. melting	29.50 to 30.00
No. 1 bundles	39.00 to 40.00
New busheling	37.00 to 38.00
Flashings	36.00 to 37.00
Machine shop turn.	23.50 to 24.00
Mixed bor. and turn.	23.50 to 24.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	26.00 to 27.00
Low phos. plate	38.00 to 39.00
No. 1 cupola cast	42.00 to 43.00
Heavy breakable cast	34.00 to 35.00
Stove plate	37.00 to 38.00
Automotive cast	46.00 to 47.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	\$36.50 to \$37.00
No. 2 hvy. melting	31.50 to 32.00
No. 1 bundles	36.50 to 37.00
No. 2 bundles, black	29.50 to 30.00
No. 2 bundles, mixed	25.50 to 26.00
Machine shop turn.	20.50 to 21.00
Mixed bor. and turn.	23.00 to 23.50
Shoveling turnings	23.50 to 24.00
Cast iron borings	23.50 to 24.00
Low phos. 18 in. under	41.50 to 42.00
Rails, random lengths	41.00 to 42.00
Rails, 18 in. and under	49.00 to 50.00
No. 1 cupola cast	46.00 to 47.00
Hvy. breakable cast	39.00 to 40.00
Drop broken cast	47.00 to 48.00

San Francisco

No. 1 hvy. melting	\$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turn.	9.00
Elec. fur. 1 ft and under	28.00
No. 1 RR. hvy. melting	20.00
Scrap rails, random lgth.	20.00
No. 1 cupola cast	\$32.00 to 33.50

Los Angeles

No. 1 hvy. melting	\$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Mach. shop turn.	5.00
Elec. fur. 1 ft and under	30.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast	\$37.00 to 39.00

Seattle

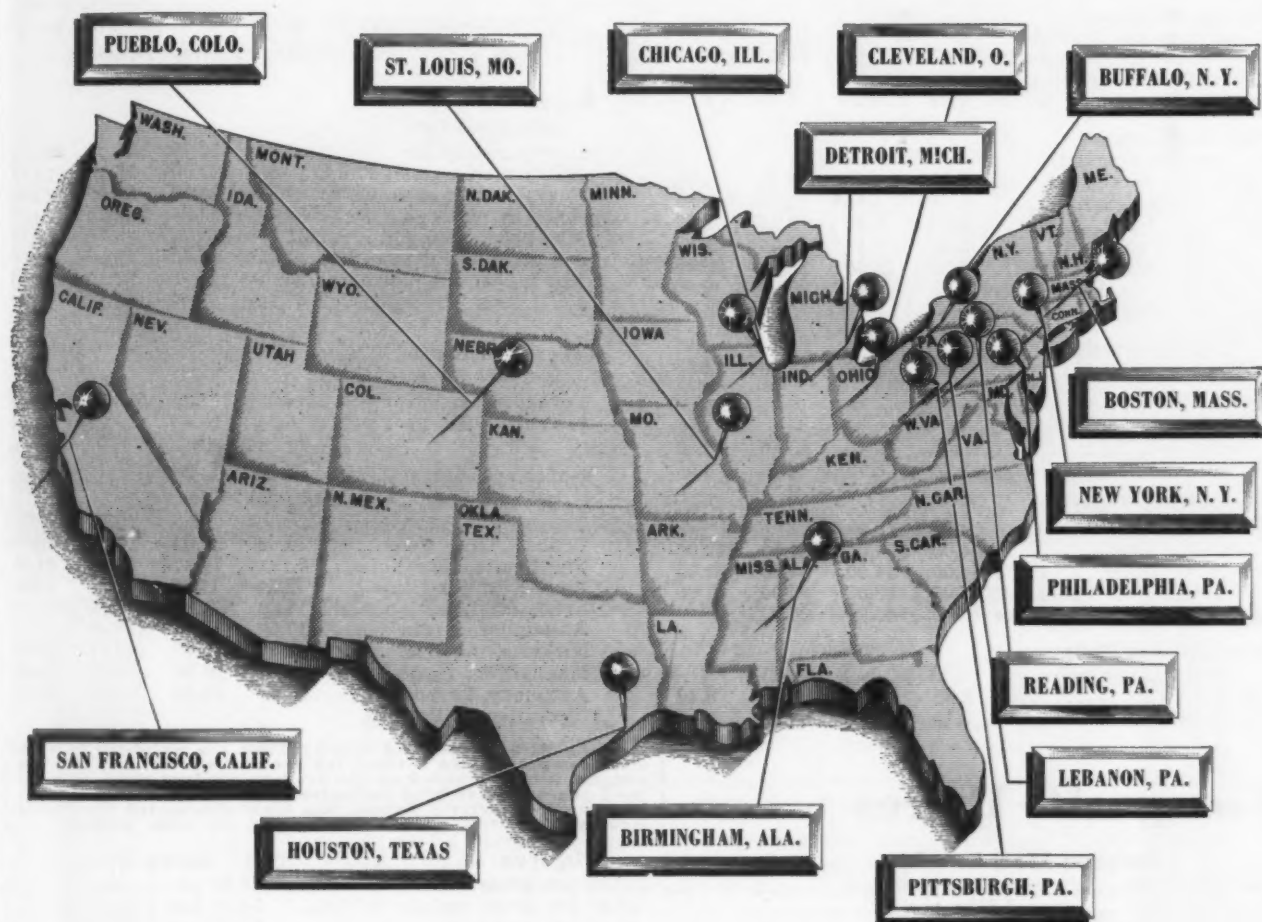
No. 1 hvy. melting	\$18.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Elec. fur. 1 ft and under	\$29.00 to 30.00
RR. hvy. melting	19.00
No. 1 cupola cast	30.00 to 35.00
Heavy breakable cast	20.00

Hamilton, Ont.

No. 1 hvy. melting	\$27.00
No. 1 bundles	19.00
No. 2 bundles	19.00
Mechanical bundles	25.00
Mixed steel scrap	23.00
Mixed bor. and turn.	20.00
Rails, remelting	27.00
Rails, rerolling	30.00
Bushellings	21.50
Bush., new fact, prep'd.	25.00
Bush., new fact, unprep'd.	20.00
Short steel turnings	20.00
Cast scrap	40.00

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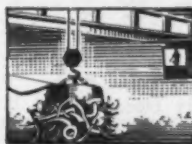
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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

June 1, 1950

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Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	May 30, 1950	May 23, 1950	May 2, 1950	May 31, 1949
(cents per pound)	1950	1950	1950	1949
Hot-rolled sheets	3.35	3.35	3.35	3.25
Cold-rolled sheets	4.10	4.10	4.10	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.25
Cold-rolled strip	4.21	4.21	4.21	4.038
Plates	3.50	3.50	3.50	3.40
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	33.00

Tin and Terneplate:	May 30, 1950	May 23, 1950	May 2, 1950	May 31, 1949
(dollars per base box)				
Tinplate (1.50 lb) cokes	\$7.50	\$7.50	\$7.50	\$7.75
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.70
Special coated mfg. ternes	6.35	6.35	6.50	6.65

Bars and Shapes:	May 30, 1950	May 23, 1950	May 2, 1950	May 31, 1949
(cents per pound)				
Merchant bars	3.45	3.45	3.45	3.35
Cold-finished bars	4.145	4.145	4.145	3.995
Alloy bars	3.95	3.95	3.95	3.75
Structural shapes	3.40	3.40	3.40	3.25
Stainless bars (No. 302)	28.50	28.50	28.50	28.50
Wrought iron bars	9.50	9.50	9.50	9.50

Wire:	May 30, 1950	May 23, 1950	May 2, 1950	May 31, 1949
(cents per pound)				
Bright wire	4.50	4.50	4.50	4.15

Rails:	May 30, 1950	May 23, 1950	May 2, 1950	May 31, 1949
(dollars per 100 lb)				
Heavy rails	\$3.40	\$3.40	\$3.40	\$3.20
Light rails	3.75	3.75	3.75	3.55

Semifinished Steel:	May 30, 1950	May 23, 1950	May 2, 1950	May 31, 1949
(dollars per net ton)				
Rerolling billets	\$54.00	\$54.00	\$54.00	\$52.00
Slabs, rerolling	54.00	54.00	54.00	52.00
Forging billets	63.00	63.00	63.00	61.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	63.00

Wire Rod and Skelp:	May 30, 1950	May 23, 1950	May 2, 1950	May 31, 1949
(cents per pound)				
Wire rods	3.85	3.85	3.85	3.40
Skelp	3.15	3.15	3.15	3.25

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron:	May 30, 1950	May 23, 1950	May 2, 1950	May 31, 1949
(per gross ton)				
No. 2, foundry, Phila.	\$50.42	\$50.42	\$50.42	\$50.56
No. 2, Valley furnace	46.50	46.50	46.50	46.50
No. 2, Southern Cin'ti.	49.08	49.08	49.08	45.47
No. 2, Birmingham	42.38	42.38	42.38	39.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	46.50
Basic del'd Philadelphia	49.92	49.92	49.92	49.74
Basic, Valley furnace	46.00	46.00	46.00	46.00
Malleable, Chicago†	46.50	46.50	46.50	46.50
Malleable, Valley	46.50	46.50	46.50	46.50
Charcoal, Chicago	68.56	68.56	68.56	73.78
Ferromanganese†	173.40	173.40	173.40	173.40

†The switching charge for delivery to foundries in the Chicago district is \$1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap:	May 30, 1950	May 23, 1950	May 2, 1950	May 31, 1949
(per gross ton)				
Heavy melt'g steel, P'gh.	\$42.25	\$38.75	\$35.25	\$22.75
Heavy melt'g steel, Phila.	32.00	29.00	26.50	21.00
Heavy melt'g steel, Ch'go	37.50	34.75	31.50	21.50
No. 1 hy. com. sh't, Det.	39.50	36.25	32.75	16.75
Low phos. Young'n.	45.75	39.75	35.75	23.75
No. 1, cast, Pittsburgh	42.75	42.00	40.50	27.75
No. 1, cast, Philadelphia	38.50	38.50	37.50	28.00
No. 1, cast, Chicago	47.50	47.50	42.50	27.50

Coke: Connellsville:	May 30, 1950	May 23, 1950	May 2, 1950	May 31, 1949
(per net ton at oven)				
Furnace coke, prompt	\$14.25	\$14.25	\$14.25	\$14.25
Foundry coke, prompt	16.25	16.25	16.25	16.25

Nonferrous Metals:	May 30, 1950	May 23, 1950	May 2, 1950	May 31, 1949
(cents per pound to large buyers)				
Copper, electro, Conn.	20.50	20.50	19.50	17.625
Copper, Lake Conn.	20.625	20.625	19.625	18.625
Tin Straits, New York	78.125†	78.375*	76.50	\$1.03
Zinc, East St. Louis	12.50	12.00	11.25	11.00
Lead, St. Louis	11.80	11.80	10.80	11.85
Aluminum, virgin	17.50	17.50	17.00	17.00
Nickel electrolytic	42.97	42.97	42.97	42.93
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	24.50	24.50	24.50	38.50

† Tentative. * Revised.

[Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)]

Composite Prices

Finished Steel Base Price	May 30, 1950
One week ago	3.837¢ per lb.
One month ago	3.837¢ per lb.
One year ago	3.705¢ per lb.

High	Low
1950.... 3.837¢ Jan. 3	3.837¢ Jan. 3
1949.... 3.837¢ Dec. 27	3.3705¢ May 3
1948.... 3.721¢ July 27	3.193¢ Jan. 1
1947.... 3.193¢ July 29	2.848¢ Jan. 1
1946.... 2.848¢ Dec. 31	2.464¢ Jan. 1
1945.... 2.464¢ May 29	2.396¢ Jan. 1
1944.... 2.396¢	2.396¢
1943.... 2.396¢	2.396¢
1942.... 2.396¢	2.396¢
1941.... 2.396¢	2.396¢
1940.... 2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939.... 2.35367¢ Jan. 3	2.26689¢ May 16
1938.... 2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937.... 2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936.... 2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935.... 2.07642¢ Oct. 1	2.06492¢ Jan. 8
1932.... 1.89196¢ July 5	1.83910¢ Mar. 1
1929.... 2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Pig Iron	Scrap Steel
.....\$46.38 per gross ton....	.....\$37.25 per gross ton.....
..... 46.38 per gross ton....	..... 34.17 per gross ton.....
..... 46.38 per gross ton....	..... 31.08 per gross ton.....
..... 45.91 per gross ton....	..... 21.75 per gross ton.....

High	Low	High	Low
\$46.38 Feb. 7	\$45.88 Jan. 3	\$37.25 May 30	\$26.25 Jan. 3
46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
		19.17 Jan. 11	15.76 Oct. 24
		\$19.17	\$19.17
		19.17	19.17
\$23.61 Mar. 20	\$23.45 Jan. 2	\$22.00 Jan. 7	\$19.17 Apr. 10
23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

May 31,
1949
\$50.56
46.50
45.47
39.38
46.50
49.74
46.00
46.50
46.50
73.78
173.40

the Chi-

\$22.75
21.00
21.50
16.75
23.75
27.75
28.00
27.50

\$14.25
16.25

17.625
18.625
\$1.03
11.00
11.85
17.00
42.93
20.50
38.50

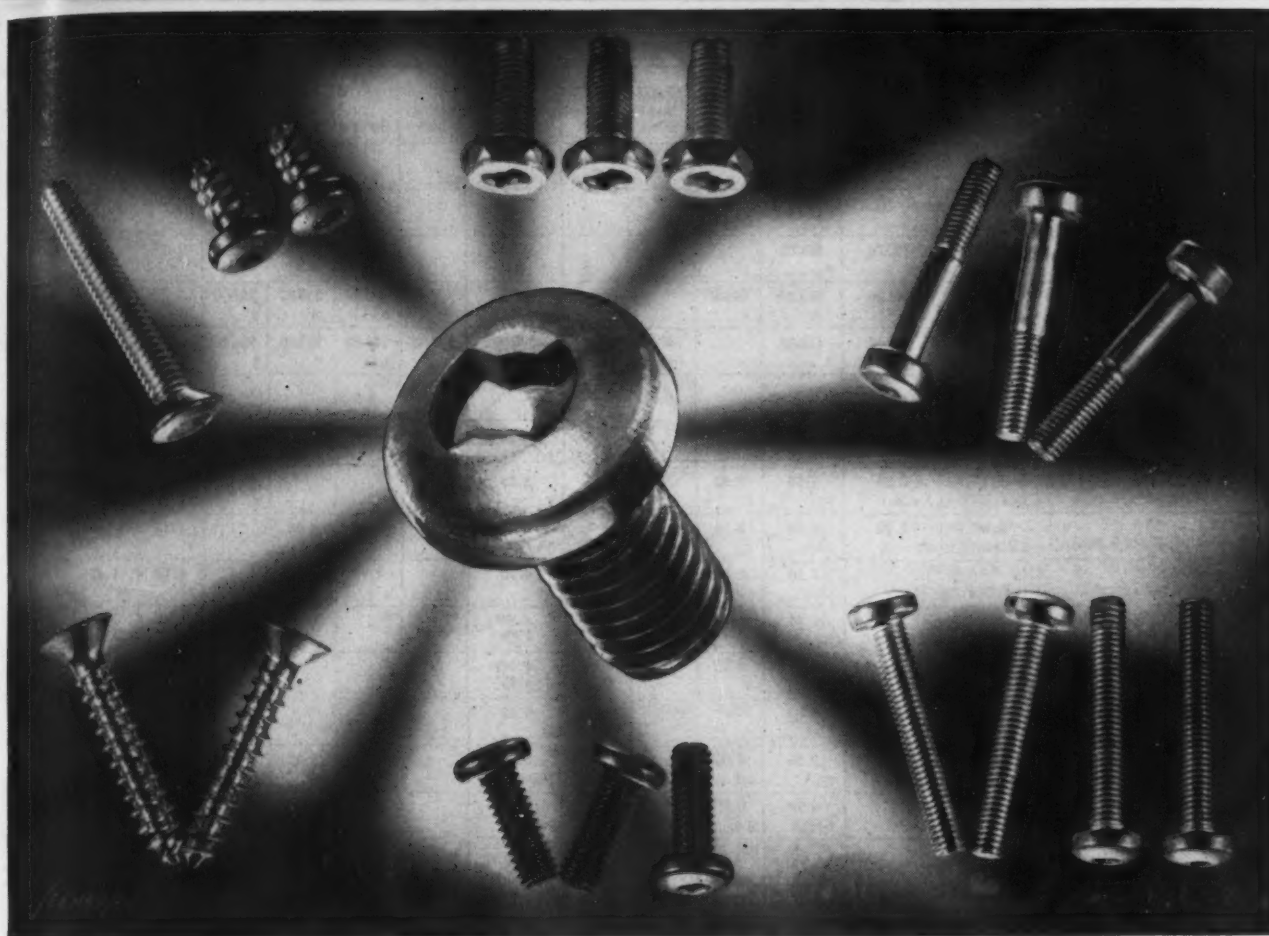
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Jan. 3
June 28
Mar. 9
May 20
Jan. 1
May 22
Oct. 24
9.17
9.17
Apr. 10
Apr. 9
May 16
June 7
June 9
June 8
Apr. 29
July 5
Dec. 8
melting
consumers
and Chi-

1950



TYPE "A"
ASSEMBLY BIT



A Sevenfold Reason Why CLUTCH HEADS Drive Assembly Costs Down

- I** The higher visibility of the wide roomy clutch recess frees the line from operator hesitation. Even "green" help drives with speed and confidence.
- II** Dead-center entry with the Center Pivot Column prevents driver canting and makes straight driving automatic . . . hence no burred or chewed-up heads.
- III** CLUTCH HEAD's exclusive non-tapered driving engagement sends skid damage to zero. With no end pressure needed to combat "ride-out" (as set up by tapered driving) a fatigue factor is eliminated . . . with resultant higher production.
- IV** Only CLUTCH HEAD has a frictional Lock-On that joins screw and bit as a unit for easy one-handed reaching into inner spots and driving from any angle.
- V** Consider the unmatched durability of the Type "A" Assembly Bit with its record of 214,000 screws driven non-stop without interruption for tool changes.
- VI** Add to this the economy of simplified reconditioning of this bit **REPEATEDLY** . . . by a 60-second application of the end surface to a grinding wheel.
- VII** For simplified field service, CLUTCH HEAD alone has a recess basically designed for operation with any flat blade which is reasonably accurate in width.

These and other cost-reduction features explain why users of America's Most Modern Screw credit change-over to CLUTCH HEAD (from other types of recessed head screws) with assembly increases ranging from 15% to 50%.



These advantages are detailed and illustrated in the New CLUTCH HEAD Brochure. Start your investigation of CLUTCH HEAD's potential savings for you by sending for your copy . . . and indicate sizes and types of screws in which you are interested.

COMMON
SCREWDRIVER



UNITED SCREW AND BOLT CORPORATION

CLEVELAND 2

CHICAGO 8

NEW YORK 7

June 1, 1950

123

IRON AGE

STEEL
PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middle- town	Youngs- town	Bethle- ham	Buffalo	Cenaho- hocken	Johns- town	Spar- rows Point	Granite City	Detroit
INGOTS														
Carbon forging, net ton	\$50.00 1													\$50.00 81
Alloy, net ton	\$51.00 1, 17													\$51.00 81
BILLETS, BLOOMS, SLABS														
Carbon, rerolling, net ton	\$53.00 1	\$53.00 1	\$53.00 1				\$57.00 13		\$53.00 3	\$58.00 26	\$53.00 3			
Carbon forging billets, net ton	\$63.00 1	\$63.00 1, 4	\$63.00 1, 8	\$63.00 4			\$63.00 25		\$63.00 3, 4	\$65.00 26	\$63.00 3			\$66.00 31
Alloy, net ton	\$66.00 1, 17	\$66.00 1, 4	\$66.00 1		\$66.00 4, 42		\$66.00 18	\$66.00 3	\$66.00 3, 4	\$68.00 26	\$66.00 3			\$66.00 31
SHEET BARS														
PIPE SKELP	3.15 1						3.15 1, 4							
WIRE RODS	3.85 2, 18	3.85 2, 4, 32	3.85 6	3.85 2			3.85 6				3.85 3	3.95 3		
SHEETS														
Hot-rolled (18 ga. & hvr.)	3.35 1, 5, 9, 15	3.35 23	3.35 1, 6, 8	3.35 4, 5			3.35 1, 4, 6, 12		3.35 3	3.45 26		3.35 2		3.55 ¹² 47, 4, 15
Cold-rolled	4.10 ¹ 5, 10, 15		4.10 1, 6, 8	4.10 4, 15		4.10 7	4.10 4, 6		4.10 3			4.10 3	4.30 22	4.30 12
Galvanized (10 gage)	4.40 1, 9, 15		4.40 1, 8		4.40 4		4.65 ^{6, 4} 4.75 ¹⁴					4.40 3		
Enameling (12 gage)	4.40 1		4.40 1, 8	4.40 4		4.40 7	4.40 ⁶ 4.90 ^{7, 6}						4.60 22	4.70 12
Long tennes (10 gage)	4.80 9, 15		4.80 1			4.80 7	4.80 64							
Hi Str. low alloy, h.r.	5.05 1, 5, 9	5.05 1	5.05 1, 6, 8	5.05 4, 5			5.05 1, 4, 6, 12		5.05 3	5.05 26		5.05 3		5.25 12
Hi str. low alloy, c.r.	6.20 1, 5, 9		6.20 1, 6, 8	6.20 4, 5			6.20 4, 6, 12		6.20 3			6.20 3		6.40 12
Hi str. low alloy, galv.	6.75 1											6.75 3		
STRIP														
Hot-rolled	3.25 5, 7, 9, 25	3.25 8, 66	3.25 1, 6, 8	3.25 5			3.25 1, 4, 6, 12		3.25 3	3.35 26		3.25 3		3.45 ¹² 47, 4, 65
Cold-rolled	4.15 5, 7, 9, 63	4.30 8, 66	4.30 8	4.15 2, 5		4.15 7	4.15 4, 6, 12, 40, 43, 49		4.15 3			4.15 3		4.35 ¹² 47, 4, 65
Hi str. low alloy, h.r.	4.95 9		4.95 1, 6, 8	4.95 5			4.95 1, 4, 6, 12		4.95 3	4.95 26		4.95 3		5.15 12
Hi Str. low alloy, c.r.	6.20 9			6.20 2, 5			6.20 4, 6, 12		6.40 3			6.40 3		6.40 12
TINPLATE†														
Cokes, 1.50-lb base box 1.25 lb. deduct 20¢	\$7.50 1, 5, 9, 15		\$7.50 1, 6, 8				\$7.50 4					\$7.60 3	\$7.70 22	
Electrolytic 0.25, 0.50, 0.75 lb box														
Deduct \$1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price														
BLACKPLATE, 29 gage	5.30 1, 5, 15		5.30 1, 6				5.30 4					5.40 3	5.50 22	
Hollowware enameling														
BARS														
Carbon steel	3.45 1, 5, 9, 17	3.45 1, 4, 23	3.45 1, 6, 8	3.45 4	3.45 4		3.45 1, 4, 6		3.45 3, 4		3.45 3			3.65 12
Reinforcing†	3.45 1, 8	3.45 4	3.45 1, 6, 8	3.45 4			3.45 1, 4, 6		3.45 3, 4		3.45 3	3.45 3		
Cold-finished	4.10 ⁵ 4.15 ^{3, 4} 17, 52, 69, 71	4.15 ² 23, 69, 70	4.15 4, 73, 74	4.15 2, 61	4.15 4, 32, 82		4.15 6, 40, 57		4.15 70					4.35 ¹² 4, 35 ¹⁴
Alloy, hot-rolled	3.95 1, 17	3.95 1, 4, 23	3.95 1, 6, 8		3.95 4		3.95 1, 6, 25	3.95 3	3.95 3, 4		3.95 3			4.25 12
Alloy, cold-drawn	4.90 2, 17, 52, 69, 71	4.90 2, 28, 69, 70	4.90 4, 73, 74	4.90 2, 61	4.90 4, 32, 82		4.90 6, 39, 57	4.90 3	4.90 3, 70					5.05 ¹⁴
Hi str. low alloy, h.r.	5.20 1, 5		5.20 1, 6, 8	5.20 4			5.20 1, 6	5.20 3	5.20 3		5.20 3			5.40 12
PLATE														
Carbon steel	3.50 1, 5	3.50 1	3.50 1, 6, 8	3.50 4			3.50 1, 13		3.50 3	3.60 26	3.50 3	3.50 3		3.75 12
Floor Plates	4.55 1	4.55 3	4.55 5	4.55 5						4.55 26				
Alloy	4.40 1	4.40 1	4.40 1				4.40 13			4.40 26	4.40 3	4.40 3		
Hi Str. low alloy	5.35 1, 5	5.35 1	5.35 1, 3	5.35 4, 5			5.35 6			5.35 26	5.35 3	5.35 3		5.60 12
SHAPES, Structural														
Hi Str. low alloy	5.15 1, 5, 9	5.15 1, 23	5.15 1, 6, 8				5.15 6	5.20 3	5.20 3		5.20 3			
MANUFACTURERS' WIRE														
Bright	4.50 2, 5, 15	4.50 ² 4, 12, 33, 34		4.50 2, 77			4.50 6	Kokomo = 4.60 ¹⁰			4.50 3	4.60 3	Duluth = 4.50 ¹² Pueblo = 4.75 ¹⁴	
PILING, Steel Sheet	4.20 ^{1, 9} 1	4.20 1							4.20 3					

Smaller numbers indicate producing companies. See key at right.
Prices are in cents per lb unless otherwise noted. Extras apply.

IRON AGE

STEEL PRICES

KEY TO STEEL PRODUCERS

With Principle Offices

- 1 Carnegie-Illinois Steel Corp., Pittsburgh
- 2 American Steel & Wire Co., Cleveland
- 3 Bethlehem Steel Co., Bethlehem
- 4 Republic Steel Corp., Cleveland
- 5 Jones & Laughlin Steel Corp., Pittsburgh
- 6 Youngstown Sheet & Tube Co., Youngstown
- 7 Armco Steel Corp., Middletown, Ohio
- 8 Inland Steel Co., Chicago
- 9 Weirton Steel Co., Weirton, W. Va.
- 10 National Tube Co., Pittsburgh
- 11 Tennessee Coal, Iron & R. R. Co., Birmingham
- 12 Great Lakes Steel Corp., Detroit
- 13 Sharon Steel Corp., Sharon, Pa.
- 14 Colorado Fuel & Iron Corp., Denver
- 15 Wheeling Steel Corp., Wheeling, W. Va.
- 16 Geneva Steel Co., Salt Lake City
- 17 Crucible Steel Co. of America, New York
- 18 Pittsburgh Steel Co., Pittsburgh
- 19 Kaiser Steel Corp., Oakland, Calif.
- 20 Portsmouth Div., Detroit Steel Corp., Detroit
- 21 Lukens Steel Co., Coatesville, Pa.
- 22 Granite City Steel Co., Granite City, Ill.
- 23 Wisconsin Steel Co., South Chicago, Ill.
- 24 Columbia Steel Co., San Francisco
- 25 Copperweld Steel Co., Glassport, Pa.
- 26 Alan Wood Steel Co., Conshohocken, Pa.
- 27 Calif. Cold Rolled Steel Corp., Los Angeles
- 28 Allegheny Ludlum Steel Corp., Pittsburgh
- 29 Worth Steel Co., Claymont, Del.
- 30 Continental Steel Corp., Kokomo, Ind.
- 31 Rotary Electric Steel Co., Detroit
- 32 Laclede Steel Co., St. Louis
- 33 Northwestern Steel & Wire Co., Sterling, Ill.
- 34 Keystone Steel & Wire Co., Peoria, Ill.
- 35 Central Iron & Steel Co., Harrisburg, Pa.
- 36 Carpenter Steel Co., Reading, Pa.
- 37 Eastern Stainless Steel Corp., Baltimore
- 38 Washington Steel Corp., Washington, Pa.
- 39 Jessop Steel Co., Washington, Pa.
- 40 Blair Strip Steel Co., New Castle, Pa.
- 41 Superior Steel Corp., Carnegie, Pa.
- 42 Timken Steel & Tube Div., Canton, Ohio
- 43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
- 44 Reeves Steel & Mfg. Co., Dover, Ohio
- 45 John A. Roebling's Sons Co., Trenton, N. J.
- 46 Simonds Saw & Steel Co., Fitchburg, Mass.
- 47 McLouth Steel Corp., Detroit
- 48 Cold Metal Products Co., Youngstown
- 49 Thomas Steel Co., Warren, Ohio
- 50 Wilson Steel & Wire Co., Chicago
- 51 Sweet's Steel Co., Williamsport, Pa.
- 52 Superior Drawn Steel Co., Monaca, Pa.
- 53 Tremont Nail Co., Wareham, Mass.
- 54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
- 55 Ingersoll Steel Div., Chicago
- 56 Phoenix Iron & Steel Co., Phoenixville, Pa.
- 57 Fitzsimmons Steel Co., Youngstown
- 58 Stanley Works, New Britain, Conn.
- 59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
- 60 American Cladmetals Co., Carnegie, Pa.
- 61 Cuyahoga Steel & Wire Co., Cleveland
- 62 Bethlehem Pacific Coast Steel Corp., San Francisco
- 63 Follansbee Steel Corp., Pittsburgh
- 64 Niles Rolling Mill Co., Niles, Ohio
- 65 Atlantic Steel Co., Atlanta
- 66 Acme Steel Co., Chicago
- 67 Joslyn Mfg. & Supply Co., Chicago
- 68 Detroit Steel Corp., Detroit
- 69 Wyckoff Steel Co., Pittsburgh
- 70 Bliss & Laughlin, Inc., Harvey, Ill.
- 71 Columbia Steel & Shaffing Co., Pittsburgh
- 72 Cumberland Steel Co., Cumberland, Md.
- 73 La Salle Steel Co., Chicago
- 74 Monarch Steel Co., Inc., Hammond, Ind.
- 75 Empire Steel Co., Mansfield, Ohio
- 76 Mahoning Valley Steel Co., Niles, Ohio
- 77 Oliver Iron & Steel Co., Pittsburgh
- 78 Pittsburgh Screw & Bolt Co., Pittsburgh
- 79 Standard Forging Corp., Chicago
- 80 Driver Harris Co., Harrison, N. J.
- 81 Detroit Tube & Steel Div., Detroit
- 82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
- 83 Sheffield Steel Corp., Kansas City
- 84 Plymouth Steel Co., Detroit

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana	
				INGOTS
				Carbon forging, net ton
				Alloy, net ton
				BILLETS, BLOOMS, SLABS
				Carbon, rerolling, net ton
				Carbon forging billets, net ton
				Alloy net ton
				SHEET BARS
				PIPE SKELP
				WIRE RODS
				SHEETS
				Hot-rolled (18 ga. & hvr.)
				Cold-rolled
				Galvanized (10 gage)
				Enameling (12 gage)
				Long ternes (10 gage)
				Hi Str. low alloy, h.r.
				Hi Str. low alloy, c.r.
				Hi Str. low alloy, galv.
				STRIP
				Hot-rolled
				Cold-rolled
				Hi Str. low alloy, h. r.
				Hi Str. low alloy, c.r.
				TINPLATE
				Cokes, 1.50-lb base box 1.25 lb. deduct 20¢
				Electrolytic 0.25, 0.50, 0.75 lb box
				BLACKPLATE, 29 gage Holloware enameling
				BARS
				Carbon steel
				Reinforcing†
				Cold-finished
				Alloy, hot-rolled
				Alloy, cold-drawn
				Hi Str. low alloy, h.r.
				PLATE
				Carbon steel
				Floor plates.
				Alloy
				Hi Str. low alloy
				SHAPES, Structural
				Hi Str. low alloy
				MANUFACTURERS' WIRE
				Bright

Notes: †Special coated mfg ternes deduct \$1.15 from 1.50-lb coke base box price.
Can-making quality blackplate, 55 to 128-lb, deduct \$1.90 from 1.50-lb coke base box.
†Straight lengths only from producer to fabricator.

STAINLESS STEELS

Base prices, in cents per pound,
f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling.....	12.75	13.50	15.00	14.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling....	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.60	18.50	15.25
Forg. discs, die blocks, rings.	30.50	30.50	33.00	32.00	49.00	36.50	41.00	24.50	25.00	25.00
Billets, forging.....	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals.....	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates.....	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50	26.50
Sheets.....	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled.....	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	26.00	21.75
Strip, cold-rolled.....	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

STAINLESS STEEL PRODUCING POINTS—*Sheets*: Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38, 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.
Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 26; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.
Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.
Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.
Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.
Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.
Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.
Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

ELECTRICAL SHEETS

22 gage, HR cut lengths, f.o.b. mill

	Cents per lb.
Armature.....	6.20
Electrical.....	6.70
Motor.....	7.95
Dynamo.....	8.75
Transformer 72.....	9.30
Transformer 65.....	9.85
Transformer 58.....	10.55
Transformer 52.....	11.35

PRODUCING POINTS—Beech Bottom, W. Va., 18; Brackenridge, Pa., 28; Folsom, W. Va., 63; Granite City, Ill., 22*; add 0.20¢; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

MERCHANT WIRE PRODUCTS

	Base Column Pittsburg, Calif.
To dealers, f.o.b. mill	
Standard & coated nails* 106	125
Woven wire fence† 116	139
Fence posts, carload†† 116	...
Single loop bale ties... 113	137
Galvanized barbed wire** 126	146
Twisted barbless wire... 126	146

* Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 columns higher. † 15¢ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet; Johnstown, 112.

	Base per 100 lb	Pittsburg, Calif.
Merch. wire, annealed‡ \$5.35	\$6.30	
Merch. wire, galv.‡... 5.60	6.55	
Cut nails, carload‡‡... 6.75	...	

‡ Add 30¢ at Worcester; 20¢ at Chicago; 10¢ at Sparrows Pt.

‡‡ Less 20¢ to jobbers.

§ Torrance, 126.

PRODUCING POINTS—*Standard*, *Coated or galvanized nails, woven wire fence, bale ties, and barbed wire*: Alabama City, Ala., 4; Atlanta, 65; Allquippa, Pa. (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 2; Joliet, Ill., 2; Kokomo, Ind., 30;

Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 34; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only), 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City, 83.
Fence posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.
Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26; Warehame, Mass., 53.

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb.....	\$3.40
Joint bars, per 100 lb.....	4.40
Light rails, per 100 lb.....	3.75

	Base Price cents per lb
Track spikes†.....	5.60
Axles.....	5.25
Screw spikes.....	8.60
Tie plates.....	4.20
Pittsburg, Torr., Calif.; Seattle... 4.35	
Track bolts, untreated**.....	8.85
Track bolts, heat treated, to rail- roads**.....	9.10

** Minnequa, deduct 25¢. † Kansas City, 5.85¢.

PRODUCING POINTS—*Standard rails*: Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, 3.

Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, 3; Minnequa, 14.

Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

Track spikes: Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, 6; Youngstown, 4.

Track bolts: Fairfield, Ala., 11; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 7, 78.

Axles: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 7; Johnstown, Pa., 3; McKees Rocks, Pa., 1.

Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburgh, Calif., 24; Pittsburgh, 4; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minnequa, Colo., 14.

Numbers after producing points
correspond to steel producers.
See key on Steel Price page.

PIPE AND TUBING

Base discounts, f.o.b. mills
Base price, about \$200.00 per net ton

Standard, T & C

Steel, Butt weld*	Black	Galv
1/4-in.	40 1/2 to 38 1/2	24 to 22
3/4-in.	43 1/2 to 41 1/2	28 to 26
1-in.	46 to 44	31 to 29
1 1/4-in.	46 1/2 to 44 1/2	31 1/2 to 29 1/2
1 1/2-in.	47 to 45	32 to 30
2-in.	47 1/2 to 45 1/2	32 1/2 to 30 1/2
2 1/2 to 3-in.	48 to 46	33 to 31

Steel, lap weld

2-in.	38	22 1/2
2 1/2 to 3-in.	42	26 1/2
3 1/2 to 6-in.	43 to 40	27 1/2 to 24 1/2

Steel, seamless

2-in.	36	20 1/2
2 1/2 to 3-in.	39	23 1/2
3 1/2 to 6-in.	41	25 1/2

Wrought Iron, butt weld

1/4-in.	+26 1/2	+53
3/4-in.	+16 1/2	+42
1 & 1 1/4-in.	+10 1/2	+33
1 1/2-in.	+4 1/2	+29 1/2
2-in.	+4	+29

Wrought Iron, lap weld

2-in.	+13 1/2	+27
2 1/2 to 3 1/4-in.	+11	+22 1/2
4-in.	+6	+26 1/2
4 1/2 to 8-in.	+8	+28
8 to 12-in.	+18	+37 1/2

Extra Strong, Plain Ends

Steel, butt weld

1/4-in.	39 1/2 to 37 1/2	24 1/2 to 22 1/2
3/4-in.	43 1/2 to 41 1/2	28 1/2 to 26 1/2
1-in.	45 1/2 to 43 1/2	31 1/2 to 29 1/2
1 1/4-in.	46 to 44	32 to 30
1 1/2-in.	46 1/2 to 44 1/2	32 1/2 to 30 1/2
2-in.	47 to 45	33 to 31
2 1/2 to 3-in.	47 1/2 to 45 1/2	33 1/2 to 31 1/2

Steel, lap weld

2-in.	37	22 1/2
2 1/2 to 3-in.	42	27 1/2
3 1/2 to 6-in.	44 1/2 to 41 1/2	30 to 27

Steel, seamless

2-in.	35	20 1/2
2 1/2 to 3-in.	38	24 1/2
3 1/2 to 6-in.	42 1/2	28

Wrought Iron, butt weld

1/4-in.	+22	+47
3/4-in.	+15 1/2	+40
1 to 2-in.	+5 1/2	+29

Wrought Iron, lap weld

2-in.	+10 1/2	+23 1/2
2 1/2 to 4-in.	+1	+22
4 1/2 to 6-in.	+5	+26 1/2
7 & 8-in.	list	+21 1/2
9 to 12-in.	+11 1/2	+29 1/2

For threads only, butt weld, lap weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt weld, lap weld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lap weld and seamless 3 1/2-in. and larger four points higher discount (lower price) applies. On butt weld and lap weld steel pipe, jobbers are granted a discount of 5 pct. *Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut lengths 10 to 24 ft inclusive.

size.

OD in in.	gage BWG	Seamless H.R.	Electric C.R.	Electric H.R.	Weld C.D.
2	13	\$20.61	\$24.24	\$19.99	\$23.51
2½	12	27.71	32.58	26.88	31.60
3	12	30.82	36.27	29.90	35.13
3½	11	38.52	45.38	37.36	43.99
4	10	47.82	56.25	46.39	54.56

Prices continued on next page

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.
(Metropolitan area delivery, add 20¢ to base price except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul (*), add 15¢; Philadelphia, add 25¢).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4815 As-rolled	Hot-Rolled, A 4140 Ann.	Cold-Drawn, A 4815 As-rolled	Cold-Drawn, A 4140 Ann.
Baltimore	5.15	6.39 ¹	6.46- 6.46 ²	5.59- 5.59 ¹¹	....	6.04 ¹¹	5.89	5.79 ¹¹	6.19	9.89	9.99	11.12	11.49
Birmingham*	5.15 ¹⁰	5.95	6.15 ⁷	5.10 ¹⁰	....	5.40	5.25	5.10 ¹⁰	6.88	....	....	....	....
Boston	5.76	6.55 ¹⁰	7.74 ⁸	5.70	6.90- 6.95	6.08	5.75	5.80	6.19- 6.69	9.70- 9.97	8.50- 10.00	11.15	11.45
Buffalo	5.15	5.95	6.90	5.41	7.27	5.53	5.35	5.15	5.75	9.80	9.90	11.05	11.35
Chicago	5.15	5.95	6.75	5.10	6.80	5.40	5.25	5.10	5.65	9.25	9.55	10.70	11.00
Cincinnati*	5.42- 5.97	5.99- 6.24	6.34- 6.39	5.35	....	5.79- 5.79	5.64 5.64	5.35- 5.64	5.96- 6.25	9.60- 9.81	9.90- 10.11	11.05- 11.20	11.35- 11.50
Cleveland	5.15	5.95	7.00	5.24	6.35	5.52	5.37	5.12	5.75	9.36	9.66	10.81	11.11
Detroit	5.33	6.08	7.09	5.49	6.27- 6.58	5.79	5.64	5.39	5.91	9.56	9.88	11.01	11.31
Houston	5.75	....	....	6.10	....	6.00	5.95	6.10	7.80	10.35- 10.45	10.50- 10.60	11.50	11.95 12.10
Indianapolis	....	....	....	7.36	....	....	....	....	....	....	....	....	....
Kansas City	5.85	6.40	7.30	5.70	6.95	5.80	5.65	5.60	6.35	9.85	10.15	11.30	11.60
Los Angeles*	5.80	7.00	7.50 ²	5.85	6.35 ¹⁶	5.80	5.70	5.80	7.55	10.05	10.20	11.70	12.10
Memphis	5.93	6.68	....	5.98	6.80	6.08	5.93	5.88	....	....	....	....	....
Milwaukee	5.29	6.09	6.84	5.24	6.32	5.54	5.39	5.24	5.89	9.39	9.69	10.84	11.14
New Orleans*	5.50 ¹	6.85 ¹	....	5.55 ¹	6.90 ¹	5.85	5.55 ¹	5.55 ¹	6.75	....	....	....	....
New York	5.55- 5.65	6.54- 6.84 ¹	7.25 ²	5.84	6.76 ⁵	6.10	5.85	5.95	6.44	9.60	9.90	11.05	11.35
Norfolk	6.10	7.00	....	6.30	....	6.15	6.20	6.15	7.20	....	....	....	....
Omaha	....	....	....	....	....	....	....	....	....	....	....	....	....
Philadelphia*	5.30	6.20	6.70 ³	5.65	6.29	5.45	5.25	5.50	6.21	9.35	9.65	10.80	11.10
Pittsburgh	5.05	5.80	6.50	5.20	6.00	5.15	5.05	5.00	5.75	9.25	9.55	10.70	11.00
Portland	6.60- 7.10 ¹	8.40 ²	8.20 ²	6.85 ³	....	6.40 ³	6.50	6.45- 6.45 ³	8.60 ¹⁴	12.00 ¹⁸	11.60 ¹⁸	....	....
Salt Lake City	5.85	6.70	8.75	7.45	8.75	6.10 ³	5.90	7.35 ³	8.75	....	....	....	....
San Francisco*	6.25 ¹¹	7.80 ²	7.55 ²	6.75 ¹¹	7.85 ¹⁶	6.15 ¹¹	6.00 ¹¹	6.15 ¹¹	7.55	10.05	10.20	11.70	12.10
Seattle	6.60 ⁴	8.15 ²	8.20 ² - 8.35 ²	6.85 ⁴	....	6.39 ⁴	6.20 ⁴	6.35 ⁴	8.50 ¹⁴	....	11.60 ¹⁸	....	13.60 ¹⁸
St. Louis	5.48	6.28	7.08	5.43	6.68- 7.54	5.73	5.58	5.43	6.08	9.58	9.88	11.03	11.33
St. Paul*	5.71	6.51	7.26	5.66	6.16- 6.82	5.96	5.81	5.66	6.31	9.81	10.11	11.26	11.56

BASE QUANTITIES: (Standard unless otherwise keyed on prices.)
Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets: 2000 to 9999 lb. Cold-finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

Exceptions:

(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 to 5999 lb; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 400 to 9999 lb; (10) 500 to 9999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 9999 lb; (16) 6000 lb and over; (17) up to 1999 lb; (18) 1000 to 4999 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity; (21) 3 to 24 bundles.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	48.50	49.00	49.50		Boston	Everett	\$0.50 Arb.		50.50	51.00		
Birmingham	41.88	42.38				Boston	Steelton	6.90					60.90
Buffalo	46.00	46.50	47.00			Brooklyn	Bethlehem	4.29		52.79	53.29	53.79	
Chicago	46.00	46.50	46.50	47.00		Cincinnati	Birmingham	6.70	48.58	49.08			
Cleveland	46.00	46.50	46.50	47.00	51.00	Jersey City	Bethlehem	2.63		51.13	51.63	52.13	
Duluth	46.00	46.50	46.50	47.00		Los Angeles	Geneva-Ironton	7.70	53.70	54.20			
Erie	46.00	46.50	46.50	47.00		Mansfield	Cleveland-Toledo	3.33	49.33	49.83	49.83	50.33	54.33
Everett		50.50	51.00			Philadelphia	Bethlehem	2.39	50.39	50.89	51.39	51.89	
Granite City	47.90	48.40	48.90			Philadelphia	Swedeland	1.44	49.44	49.94	50.44	50.94	
Ironton, Utah	46.00	46.50				Philadelphia	Steelton	3.09					57.06
Pittsburgh	46.00	46.50	46.50	47.00		Rochester	Buffalo	2.63	48.63	49.13	49.63		
Geneva, Utah	46.00	46.50				San Francisco	Geneva-Ironton	7.70	53.70	54.20			
Sharpsville	46.00	46.50	46.50	47.00		Seattle	Geneva-Ironton	7.70	53.70	54.20			
Steelton	46.00	46.50	49.00	49.50	54.00	St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65		
Swedeland, Ohio	46.00					Syracuse	Buffalo	3.58	49.58	50.08	50.58		
Toledo	46.00	46.50	49.00	49.50									
Troy, N. Y.	46.00	46.50	49.00		54.00								
Youngstown	46.00	46.50	46.50	47.00									

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese

content in excess of 1.00 pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct C/L per g.t., f.o.b. Jackson, Ohio—\$57.00; f.o.b. Buffalo, \$58.25. Add \$1.00 per ton for each additional 0.50 pct Si up to 17 pct.

Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferro-silicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus \$60.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, \$68.56. High phosphorus charcoal pig iron is not being produced.

ARDCOR TUBING ROLLS



★ These Tubing Rolls, made of ARDCORLOY*—a special alloy steel, were designed and manufactured by ARDCOR for one of America's leading Welded Tube Manufacturers (name on request).

* PRODUCTION PROVEN—30% more footage!

What are YOUR Roll Forming Requirements?

ARDCOR SPECIALTIES

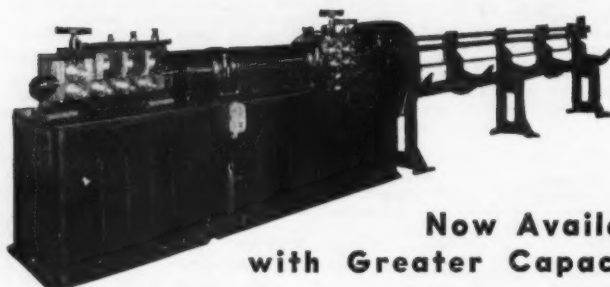
ARDCORLOY ROLLER DIES • ROLL FORMING MACHINERY • FLYING SHEAR AND CUT-OFF MACHINES • CRADLE REELS • SPECIAL PRODUCTION MACHINERY

American ROLLER DIE CORPORATION

20650 St. Clair Avenue • Cleveland 17, Ohio

The Straightener That Cuts Accurate Lengths!

SHUSTER



**Now Available
with Greater Capacity!**

Type 3A now straightens wire from 1/4" to 1/2" dia., 9/16" in basic wire. Type 4A (similar to illustration) handles diameters from 3/8" to 1 1/16" wire. Other advantages are:

- Almost continuous wire travel
- Lightning cut-off assures square-cut ends
- High speed, direct driven 5-die straightening flier
- Quiet, highly efficient V-belt motor drive
- Ball and roller bearings throughout
- Variable speed drives

Write for catalog

METTLER MACHINE TOOL, INC.

132A Lawrence Street New Haven, Conn.

Representatives in all principal cities and in foreign countries.

IRON AGE MARKETS & PRICES
FOUNDED 1855

Continued

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts, f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)
Base discount

Machine and Carriage Bolts

	Pct Off List
1/2 in. & smaller x 6 in. & shorter	27 28
9/16 & 5/8 in. x 6 in. & shorter...	29 40
3/4 in. & larger x 6 in. & shorter...	26 37
All diam, longer than 6 in.	22 34
Lag, all diam over 6 in. & longer	28 39
Lag, all diam x 6 in. & shorter...	30 41
Plow bolts	40 —

Nuts, Cold Punched or Hot Pressed (Hexagon or Square)

1/2 in. and smaller.....	25 37
9/16 to 5/8 in.	23 35
3/4 to 1 1/2 in. inclusive.....	23 35
1 1/2 in. and larger.....	16 33

Semifinished Hexagon Nuts

(Less case lots)

	Pct Off List
1/2 in. and smaller.....	41 35 41
9/16 to 5/8 in.	36 30 34
3/4 to 1 1/2 in.	31 27 31
1 1/2 in. and larger.....	21 17 —

In full case lots, 15 pct additional discount.

Steel Bolts

	Pct Off List
Packaged, steel, plain finish...	63
Packaged, plated finish.....	50
Bulk, plain finish**.....	69*

* Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

** Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Large Rivets

(1/2 in. and larger)

Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa. \$7.25

Small Rivets

(7/16 in. and smaller)

Pct Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 43

Cap and Set Screws

(In bulk)

	Pct Off List
Hexagon head cap screws, coarse or fine thread, 1/4 in. thru 5/8 in. x 6 in., SAE 1020, bright.....	60
1/4 in. through 5/8 in. x 6 in. and shorter high C heat treated.....	54
Milled studs	23
Flat head cap screws, listed sizes....	24
Fillister head cap, listed sizes.....	43
Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. and shorter	59

C-R SPRING STEEL

	Base per pound f.o.b. mill
0.26 to 0.40 carbon.....	4.15¢
0.41 to 0.60 carbon.....	5.95¢
0.61 to 0.80 carbon.....	6.85¢
0.81 to 1.05 carbon.....	8.50¢
1.06 to 1.35 carbon.....	10.80¢

Worcester, add 0.30¢.

LAKE SUPERIOR ORES

(51.50% Fe: natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer.....	\$5.10
Old range, nonbessemer.....	7.35
Mesabi, bessemer	7.45
Mesabi, nonbessemer	7.70
High phosphorus	7.70

After Jan. 25, 1950, increases or decreases in Upper Lake rail freight, dock handling charges and taxes are for buyers' account.

PRICES
continued
SET

burgh,
icago)

t Off List
Less
Case C.
27 38
29 40
26 37
22 34
28 39
30 41
40 —

ressed

25 37
23 35
22 35
16 29

Off List
Ivy L.
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30 36
27 33
17 —
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63
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69*
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size and
shorter;
an 3-in.
price ap-

or nickel
net. For

(larger)
100 lb
1-
a. \$7.35

(smaller)
t Off List
ago.
... 43

t Off List
e or
x 6
... 60
and
... 54
... 23
... 24
... 43
in.
rter 59

4.15¢
5.95¢
6.55¢
8.50¢
10.80¢

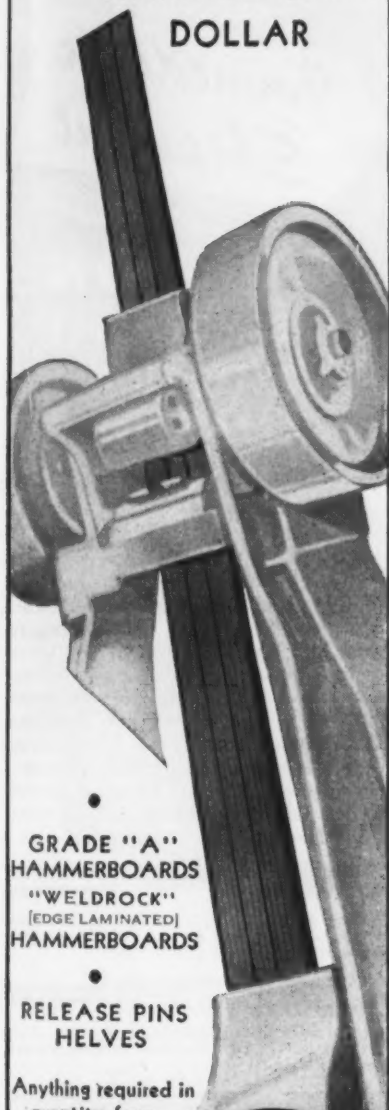
ES

livered

gross ton
... \$8.19
... 7.95
... 7.85
... 7.70
... 7.70
or deht. dock
buyers

IRWIN

MORE FORGINGS
per
HAMMERBOARD
DOLLAR



GRADE "A"
HAMMERBOARDS
"WELDROCK"
[EDGE LAMINATED]
HAMMERBOARDS

RELEASE PINS
HELVES

Anything required in
quantity from
Pennsylvania's
hard woods—
maple and cherry

IRWIN
50 YEARS
of Quality

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BRETT'S PATENT LIFTER CO., LTD.

Foleshill Works • Coventry, England

IRON AGE
FOUNDED 1855

MARKETS & PRICES

Continued

ELECTRODES

Cents per lb., f.o.b. plant, threaded
electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
GRAPHITE		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
CARBON		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
20	84, 90	7.50¢
17	60, 72	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. (21)...	*26.50	
Washgtn, Pa. (39)....	*26.50	
Claymont, Del. (29)...	*26.50	
Conshohocken, Pa. (26)		*22.50
New Castle, Ind. (55)...	*26.50	*24.00
Nickel-carbon		
10 pct, Coatesville (26)...	27.50	
Inconel-carbon		
10 pct, Coatesville (21)...	36.00	
Monel-carbon		
10 pct, Coatesville (21)...	29.00	
No. 302 Stainless-copper-		
stainless, Carnegie, Pa.		75.00
(60)		
Aluminized steel sheets, hot		
dip, Butler, Pa. (7)....		7.75

* Includes annealing and pickling, or
sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	\$1.60
18	4	1	—	5	\$1.565
18	4	2	—	—	\$1.13
1.5	4	1.5	8	—	71.5¢
6	4	2	6	—	76.5¢
High-carbon-chromium					57.5¢
Oil hardened manganese					32¢
Special carbon					29.5¢
Extra carbon					24.5¢
Regular carbon					31¢
Warehouse prices on and east of Mis-					
sissippi are 2½¢ per lb higher. West of					
Mississippi, 4½¢ higher.					

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$14.00 to \$14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$16.00 to \$16.50
Foundry, oven coke	
Buffalo, del'd	\$24.00
Chicago, f.o.b.	21.00
Detroit, f.o.b.	20.40
New England, del'd	23.40
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	21.25
Swedeland, Pa., f.o.b.	21.20
Painesville, Ohio, f.o.b.	21.90
Erie, del'd	\$21.04 to 21.25
Cleveland, del'd	22.62
Cincinnati, del'd	22.71
St. Paul, f.o.b.	21.00
St. Louis, del'd	21.60
Birmingham, del'd	20.20

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars,
Rosiclare, Ill. Base price, per ton net;
Effective CaF₂ content:

70% or more	\$37.00
60% or less	34.00

Prices Continued on Next Page

SMALL
STAMPINGS

Any Metal
Any Quantity

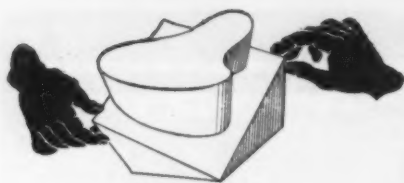
30 years' experience
gives us the
"know how"

Hundreds of satisfied
customers are evidence
of our high quality

THE
MASTER PRODUCTS

COMPANY

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The shape's the thing...

The selection of a suitable steel and its subsequent satisfactory performance can be made easy by good design.

How and in what shape a part is made is, we hold, of fundamentally greater importance than of what it is made.

In designing a piece of machinery it is necessary to consider Design, the choice of steel, and its Heat Treatment. All three are highly significant factors, but of them we believe Design to be vital because even the best in steel and treatment will not save a poorly designed part.

To evaluate the importance of good design and its vital relationship to the selection of steel and its heat treatment, we have prepared a book—"Three Keys to Satisfaction". This starts by discussing mainly design factors involved in stress concentrations, and includes useful sketches comparing poor and good features of design from the aspect of subsequent metal-lurgy. It is available on request to all engineers and designers.

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FREE BOOKLET
3 KEYS TO SATISFACTION

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Position.....
Company.....
Address.....

IA-6

R-B-F-17

IRON AGE FOUNDED 1855

MARKETS & PRICES

Continued

REFRACTORIES (F.o.b. works)

Fire Clay Brick	Carloads, Per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5).....	\$86.00
No. 1 Ohio	80.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	80.00
No. 2 Ohio	72.00
Ground fire clay, net ton, bulk (ex- cept Salina, Pa., add \$1.50)	14.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$86.00
Childs, Pa.	90.00
Hays, Pa.	91.00
Chicago District	95.00
Western Utah and Calif.	101.00
Super Duty, Hays, Pa., Athens, Tex., Chicago	106.00
Silica cement, net ton, bulk, East- ern (except Hays, Pa.)	15.00
Silica cement, net ton, bulk, Hays, Pa.	17.00
Silica cement, net ton, bulk, Ensley, Ala.	16.00
Silica cement, net ton, bulk, Chi- cago District	16.00
Silica cement, net ton, bulk, Utah and Calif.	22.50

Chrome Brick

Standard chemically bonded, Balt., Chester	Per Net Ton
.....	\$69.00

Magnesite Brick

Standard, Baltimore	\$91.00
Chemically bonded, Baltimore	80.00

Grain Magnesite

Domestic, f.o.b. Baltimore, St. % - in. grains	
In bulk fines removed	\$56.00 to \$57.00
Domestic, f.o.b. Chewelah, Wash.,	
In bulk	33.00
In sacks	38.00

Dead Burned Dolomite

F.o.b. producing points in Pennsyl- vania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	\$12.25
--	---------

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.	
Swedish sponge iron c.l.f. New York, ocean bags....	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, mi- nus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to \$1.35
Aluminum	\$1.50¢
Brass, 10 ton lots	23.50¢ to 27.25¢
Copper, electrolytic	27.75¢
Copper, reduced	27.00¢
Cadmium, 100-199 lb	\$2.95
Chromium, electrolytic, 99% min., and quantity	\$3.50
Lead	17.00¢
Manganese	52.00¢
Molybdenum, 99%	\$2.65
Nickel, unannealed	\$6.00¢ to 66.00¢
Nickel, annealed	72.00¢
Nickel, spherical, unannealed	69.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal values
Stainless steel, 302	75.00¢
Tin	85.75¢
Tungsten, 99%	\$2.90
Zinc, 10 ton lots	15.75¢ to 18.50¢

CAST IRON WATER PIPE

Per net ton	
6 to 24-in., del'd Chicago	\$91.80 to \$95.30
6 to 24-in., del'd N. Y.	91.00 to 92.00
6 to 24-in., Birmingham	78.00 to 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	\$108.50 to \$113.00
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

Price Continued on Page 134

Precision Quality!

Immediate Shipment

GORDON THERMOCOUPLE EXTENSION LEAD WIRE

There are two good reasons why we stress Gordon Quality and Gordon Service. (1) The precision quality of Gordon Thermocouple Extension Lead Wire is based upon 36 years of experience in careful selection and inspection to meet rigid insulation requirements. (2) Gordon's Chicago and Cleveland plants carry complete stocks of Thermocouple Extension Lead Wire for practically every application. (See illustrations below.) This means that your order gets immediate delivery of a QUALITY product—one that meets Bureau of Standards Specifications. ORDER NOW! No waiting or delay. Prices available upon request.

CHROMEL-ALUMEL, Cat. No. 1231(3-A), 14 ga., STRANDED-DUPLEX, each wire felted asbestos, Asbestos-yarn braid overall.

FOR PLATINUM THERMOCOUPLES, Cat. No. 1225, 16 ga., STRANDED-DUPLEX, each wire felted asbestos, Asbestos-yarn braid overall.

CHROMEL-ALUMEL, Cat. No. 1234, 14 ga., SOLID-DUPLEX, each wire enamel, felted asbestos, Asbestos-yarn braid overall.

IRON-CONSTANTAN, Cat. No. 1236-C, 14 ga., STRANDED-DUPLEX, each wire felted asbestos, Asbestos-yarn braid overall.

COPPER-CONSTANTAN, Cat. No. 1235-A, 14 ga., SOLID-DUPLEX, each wire cotton, rubber, weatherproof braid, lead sheath overall.

GORDON SERVICE

CLAUDE S. GORDON CO.

Specialists for 36 Years in the Heat Treating
and Temperature Control Field
Dept. 16 • 3000 South Wallace St., Chicago 16, Ill.
Dept. 16 • 2035 Hamilton Ave., Cleveland 14, Ohio



Republic Electro Paintlok **Scores HIGH with Lasting Paint Adherence**

For long-lasting good looks and sales appeal, the entire outer cabinet of this popular cup-type beverage dispenser is made of Republic Electro Paintlok.

This chemically-treated, zinc-coated sheet steel scores high every time with *lasting* beauty of finish. It has been developed specifically to *take* and *hold* paints, lacquers and synthetic enamels. Its tight zinc coating protects the product against unsightly underfilm corrosion, should its painted surface be scratched or marred in service.

What's more, Republic Electro Paintlok scores high in manufacturing economies, too. It comes

to you clean and in prime condition for painting . . . ordinarily requires no degreasing . . . needs only simple cleaning procedure just before painting to remove dirt acquired during fabrication. Properly stored, it can be stocked for long periods without danger of rusting.

It can help your product make higher scores in sales acceptance and service durability, too. Write us for more information, specifically applied to your products and production methods.

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GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.



Your free copy of booklet ADV-525 is ready for you now. Plenty of factual information, including fabricating tips and current applications for Republic Electro Zinc Plated Steel Sheets, is packed into its 12 colorful pages. Write for your personal copy.

Republic
ELECTRO ZINC PLATED SHEETS
Electro Paintlok • Electro Zincbond



Other Republic Products include Carbon, Alloy and Stainless Steels—Sheets, Strip, Plates, Bars, Pipe, Tubing, Bolts and Nuts, Wire

For Use In:

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COKE DEPT.

STRIP MILL

STORES DEPT.

TOOL WORKS

OPEN HEARTH

SCRAP YARDS

MACHINE SHOP

ROLLING MILL

FORGING PLANT

BLOOMING MILL

MAINTENANCE DEPT.

CONSTRUCTION DEPT.

COLD-DRAWN BAR MILL



KRANE KAR
swings load to
either side

KRANE KAR is a lively swing-boom mobile crane, gas or diesel operated, of compact dimensions, short turning radius. It transports any load it can lift. Put it to work in any part of your plant, yard, or stores; it will speed up production, cut down handling costs. Available for service 24 hours a day, every day.

9 to 37 ft. booms or adjustable telescopic booms. Electric magnet, clam-shell bucket, and other accessories available. Write for Bulletin No. 79.

THE ORIGINAL SWING-BOOM MOBILE CRANE
WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER
1½, 2½, 5, AND 10 TON CAPACITIES

KRANE KAR

Mrs. of Car Movers,
Winches, Truck Cranes, etc.

SILENT HOIST & CRANE CO., 851 63rd ST., BROOKLYN 20, N.Y.

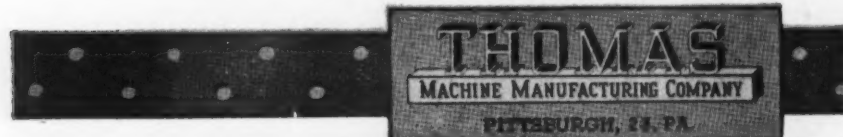
THOMAS
Heavy Duty

**BILLET
SHEARS**

*for long and
distinguished
service*

THOMAS Heavy Duty Billet Shears are built in capacities from 500 to 2000 tons, with the primary objective of delivering to the user many years of efficient, trouble-free service. And they do!

Write for Bulletin 311



PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

IRON AGE
FOUNDED 1855

MARKETS & PRICES

Continued

FERROALLOYS

Ferromanganese
78-82% Mn. maximum contract base price, gross ton, lump size.
F.o.b. Birmingham \$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont. \$172
F.o.b. Johnstown, Pa. \$174
F.o.b. Sheridan, Pa. \$172
F.o.b. Etna, Clairton, Pa. \$175
\$2.00 for each 1% above 82% Mn. penalty, \$2.15 for each 1% below 78%
Briquets—Cents per pound of briquet delivered, 66% contained Mn.
Carload, bulk 10.41
Ton lots 12.05

Spiegeleisen

Contract prices gross ton, lump, f.o.b.
16-19% Mn 19-21% Mn
3% max. Si 3% max. Si
Palmerton, Pa. \$64.00 \$65.00
Pgh. or Chicago 65.00 66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe 35.1
Carload, packed 37.0
Ton lots 37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
Carloads 21
Ton lots 20
Less ton lots 32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn 18.15c

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.
Carloads Ton Less
0.07% max. C, 0.06% P, 90% Mn 25.25 27.10 28.30
0.10% max. C 24.75 26.60 27.80
0.15% max. C 24.25 26.10 27.30
0.30% max. C 23.75 25.60 26.80
0.50% max. C 23.25 25.10 26.30
0.75% max. C, 7.00% max. Si 20.25 22.10 23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.
Carload bulk 8.95
Ton lots 10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet 10.20
Ton lots 11.90

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$77.00 gross ton, freight allowed to normal trade area; Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$73.50. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.
96% Si, 2% Fe 20.70
97% Si, 1% Fe 21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.
Carload, bulk 6.30
Ton lots 7.90

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.
25% Si 17.00 75% Si 13.50
50% Si 11.30 85% Si 14.55
90-95% Si 16.50

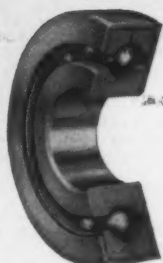
Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.
Cast Turnings Distilled
Ton lots \$2.05 \$2.95 \$3.75
Less ton lots 2.40 3.30 4.55

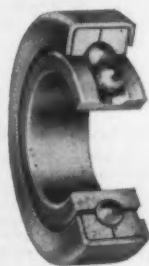
Prices Continued on Page 138

for the PRODUCT DESIGNER . . .

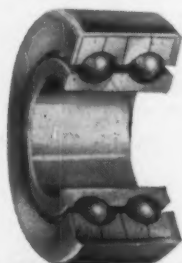
an IMPORTANT NEW ADDITION



"100" Series Ground Deep Groove Radial, Full Ball Type, Soft Outer Band, Inch Sizes.



"400" Series Unground Deep Groove Radial, Full Ball Type, Soft Outer Band, Inch Sizes.



"1200" Series, Similar to "400" Series Except Double Row.



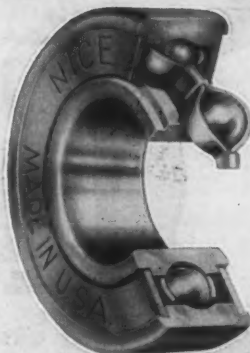
"K" Series (Aircraft and Commercial) Precision Deep Groove Radial, Full Ball Type, Double Shielded, Inch Sizes.



NEW!
COMPOSITION SEAL*
(OIL RESISTANT SYN-
THETIC RUBBER COATED
FABRIC)
*PATENT APPLIED FOR

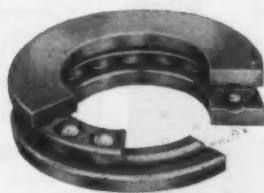
"1600" and "3000"
Series Composition Sealed

to the NICE LINE



"1600" and "3000"
Series Shielded or Open

Available as Illustrat-
ed, Series "1600" Low
Cost Precision Radial
Bearings and Series
"3000" Unground
"Precision Type" Radi-
als, Metal Shielded or
Open, or with COMPO-
SITION SEALS. Solid
Race and Cone with
Retainer, Inch Sizes.



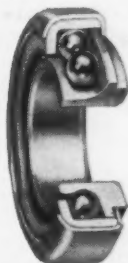
Ground Thrusts, Series "1000"
"1100", "2600" and "2700",
with Retainer, Inch and
Metric Sizes.



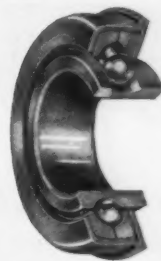
"600" Series Self Contained
Unground Thrust, Full Ball
Type, Soft Outer Band,
Inch Sizes.



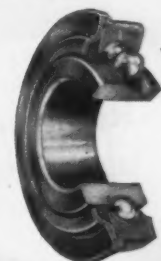
"500" Series Unground Radial
and Thrust, Full Ball Type,
Pressed Cone, Soft Outer Band,
Inch Sizes.



"700" Series Unground Radial
and Thrust, Full Ball Type,
Solid Cone, Soft Outer Band,
Inch Sizes.



"Flanged" Series, Similar to
"400" Series Except Outer
Band Flanged.



"Flanged" Series, Similar to
"400" Series Except Felt Sealed
and Outer Band Flanged.



NICE BALL BEARING COMPANY
NICETOWN PHILADELPHIA PENNSYLVANIA

For complete infor-
mation on the NICE
Line write for New
Catalog No. 140



Helping to make a good product Even Better!

Polarized light used with photoelastic equipment to check stresses and strains in gear teeth is just one of the many steps Fairfield takes to help make good products even better! There is no finer recommendation for the quality of the product you sell than to be able to say that it is "Equipped with FAIRFIELD GEARS!" Long producers of the gears needed in high grade trucks and tractors, Fairfield now brings the same standards for gear performance to a wide variety of products: Road Graders... Machine Tools... Diesel Engines... and a host of others. Get acquainted with FAIRFIELD! Send for interesting, illustrated brochure.

FAIRFIELD For FINE GEARS
FAIRFIELD MANUFACTURING COMPANY
305 South Earl Avenue • Lafayette, Indiana

Yes, but *when* are stainless steel prices coming down so that we can lower our costs and still show a profit?

Right now. We can cut your costs up to 30%. How? **WRITE TODAY!**

Submit specifications on sheet, strip, rod, wire and tubing. Large stocks in principal cities.

DEPENDABLE Sales 
CORPORATION
315 Gold St., Brooklyn 1, N. Y.

IRON AGE MARKETS & PRICES

FOUNDED 1855

Continued

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max Si.)

0.06% C	28.75	0.20% C	27.75
0.10% C	28.25	0.50% C	27.50
0.15% C	28.00	1.00% C	27.15
2.00% C			27.00
65-69% Cr, 4-8% C			20.50
62-66% Cr, 4-6% C, 6-9% Si			21.35

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-4% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	26.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.95

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	\$1.00
0.50% max. C	1.05
.00 min. C	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 20.50¢ per lb of contained Cr plus 11.30¢ per lb of contained Si. Bulk 1-in. x down, 20.65¢ per lb contained Cr plus 11.50¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.	
Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.	
Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	
Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Prices Continued on Page 142

PRICES
continued

nd, con-
carloads,
\$1.)
... 27.75
... 27.50
... 27.25
... 27.00
... 26.50
... 21.35

, 0.75%
carbon
6¢ for

nd chro-
red.
r, 4-6%

... 21.60
... 23.75
... 25.25
4-6% \$1.

... 27.75
... 30.85
... 31.35

um con-
s. 97%

... \$1.00
... 1.05
... 1.04

(max.)
Niagara
x down,
of con-
tained \$1.
lb con-
tained \$1.

, lump,

max. Fe.
... 17.50
... 21.00
... 22.50

t alloy,

\$1.
... 19.25
... 21.55
... 22.55

of al-

18-21%
13.50-
00% C.
19.75
21.00

Suspen-
d, max.
9% \$1.

15.75¢
17.00¢

b. Sus-
allowed,
to 11%.

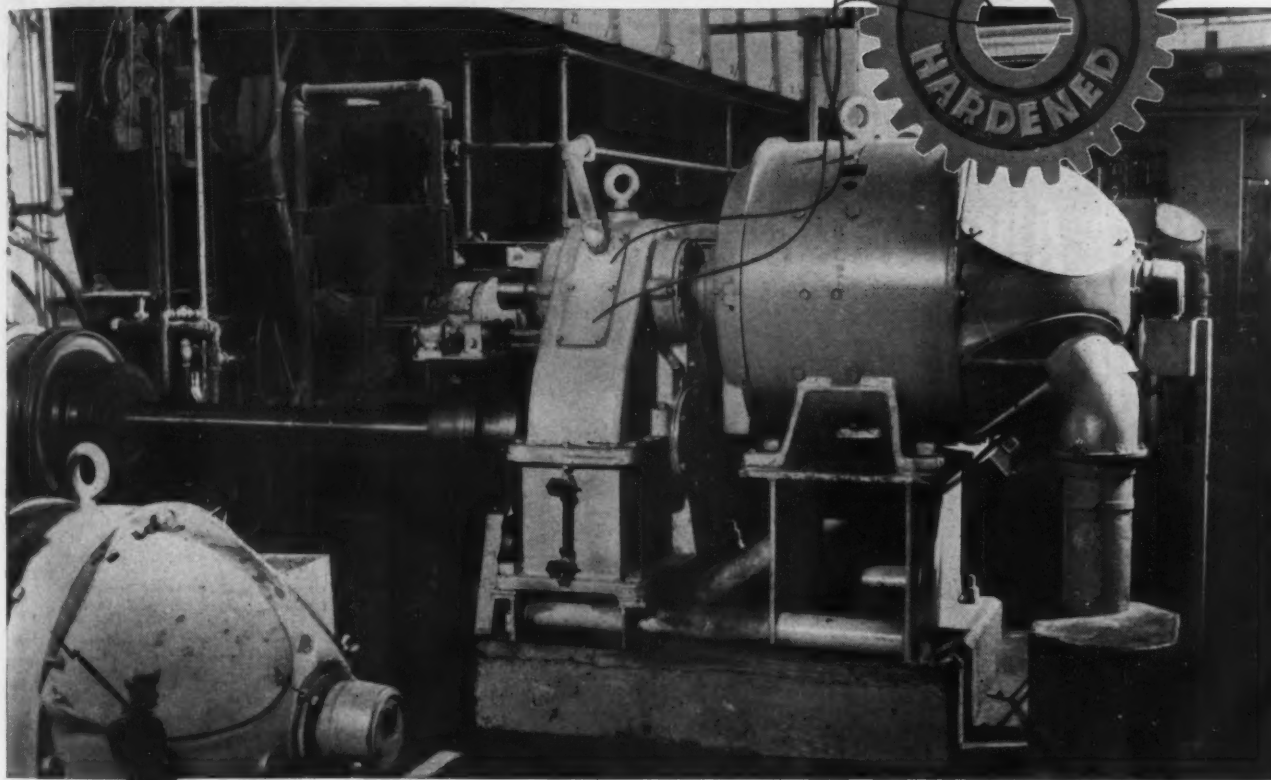
17.00¢
18.00¢
19.50¢

t alloy,
7% Zr,

17.35
18.50
42

1950

YOU CAN BE SURE... IF IT'S Westinghouse



"Old Soldiers Never Die..."

Here's an "old soldier" that is still hale and hearty after more than 20 years of around-the-clock duty on the industrial "firing line" at the Crown-Zellerbach Paper Mill.

The "old soldier" was recently inspected, and here's what was found: "The old PS-30 Westinghouse Speed Reducer has been operating for over 20 years. When we took off the inspection plate to check the condition of the gears in this old unit, we found the gearing to be in excellent condition. Full face-full depth contact over gear and pinion teeth and perfect contour wear on both. I regret that I did not have tooth calipers with me, as the only way I could get any indication of wear was by scratching the ends of the pinion faces; am sure the wear was not over .010."

Such service from Westinghouse Speed Reducers is not at all unusual, in fact it is commonplace in hundreds of installations.

Crown-Zellerbach started using Westinghouse Speed Reducers years ago for their proven reliability and freedom from maintenance. Their experience with 25 of these units testifies to the toughness of the taper-hardened, single helical gears . . . the smooth, quiet power transmission of these gears riding on tapered roller bearings . . . the efficiency of the simple, positive lubrication system with the two-compartment reservoir . . . the easy accessibility of the rugged split case.

For complete information, write for Bulletin DB-3700 SR, Westinghouse Electric Corporation, Dept. 156, P. O. Box 868, Pittsburgh 30, Pa.

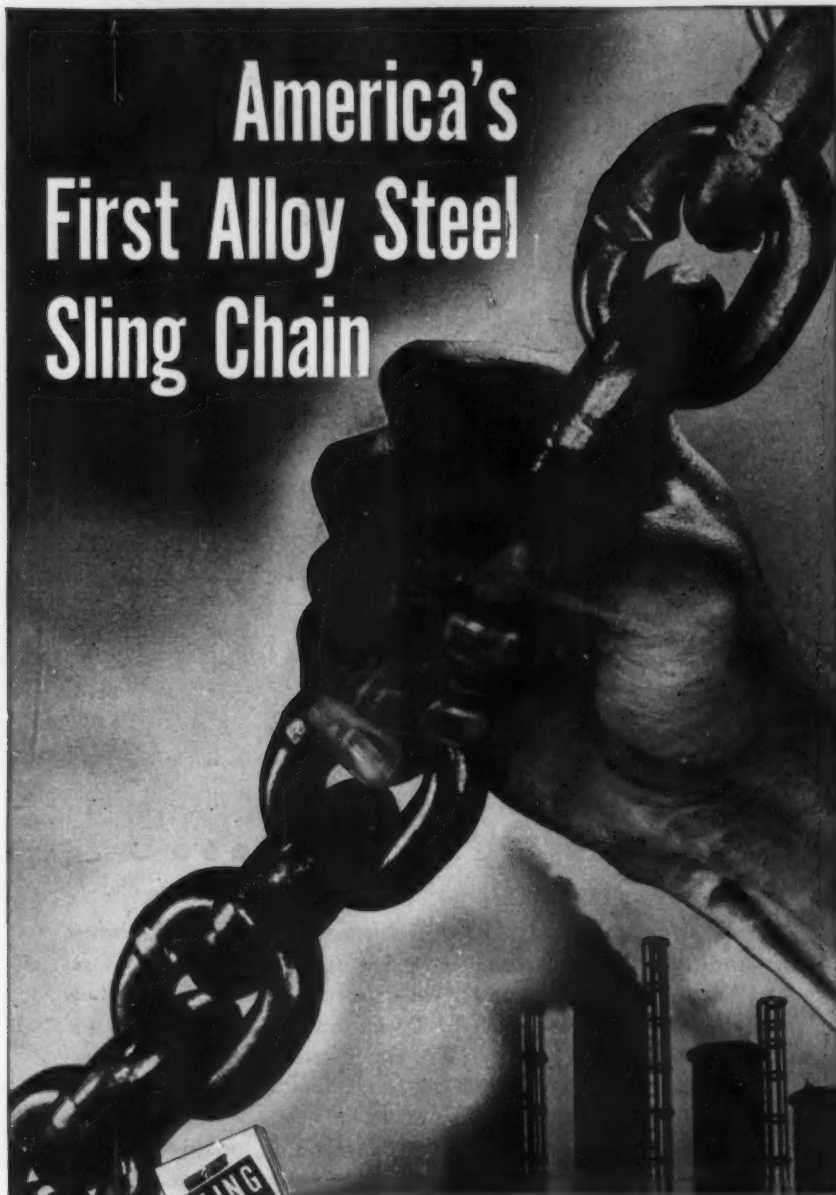
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Westinghouse

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IRON AGE MARKETS & PRICES
FOUNDED 1855

Continued

Other Ferroalloys

Alseifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.65¢
Ton lots	9.05¢
Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo	96¢
Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.	
Ton lots	\$3.50
Less ton lots	3.55
Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	\$3.67
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo	\$1.13
Ferrophosphorus, electrolytic, 33-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton	\$65.00
10 tons to less carload	76.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.23
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	\$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	\$160.00
Ferrotungsten, standard, lump or 1/4 x down, packed, per pound contained W, 5 ton lots, delivered	\$2.25
Ferrovandium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	\$2.30
Crucible	2.00
High speed steel (Primus)	3.10
Molybde oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	95¢
bags, f.o.b. Washington, Pa., Langeloth, Pa.	94¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound Carload, bulk, lump	11.00¢
Ton lots, bulk, lump	11.50¢
Less ton lots, lump	12.35¢
Vanadium pentoxide, 88-92% V ₂ O ₅ , contract basis, per pound contained V ₂ O ₅	\$1.20
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk	6.50¢

Boron Agents

Contract prices, per lb of alloy, del.	
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	\$4.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.025¢
Ferroboration, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots	\$1.20
F.o.b. Wash., Pa.; 100 lb, up	
10 to 14% B .....	.75
14 to 19% B	1.20
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	83¢
No. 79	45¢
Manganese-Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	\$1.67
Less ton lots	1.79
Nickel-Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	\$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢

BUILDERS OF THE BRASS INDUSTRY



PIERCE N. WELCH

(Fifth President of BRISTOL BRASS)

The man who dropped the Clock . . . who enlarged and refinanced the Bristol Mills . . . who saw Bristol Brass through the 1907 panic . . . and who spoon-fed the business by stimulating the demand for sales-premiums

THIRD of the Welch clan to become head of The Bristol Brass and Clock Co., new president Pierce immediately shortened the firm-style to The Bristol Brass Co., then completed the expansion program sparked by director Charles S. Treadway.

The seven years of Pierce Welch's presidency saw a mounting momentum in world events: Independence for Cuba and Panama, the Canal Treaty, world's first labor government (which lasted a few months) in Australia, Luther Burbank, the Sinn Feiners, T. R. out and Taft in, the North Pole dis-

covered and wireless telegraphy added to the wonders of the world, the Russo-Jap war and the first Russian revolt.

Meantime, Bristol rolled along in high gear, a lot more steadily than the new-fangled autos you began to see everywhere. And Bristol's spoon-shop, boomed by souvenirs of the battleship Maine, made Bristol's "World Brand" plated flatware a favorite premium of soap, cereal and flour merchants. Then copper tycoon Gus Heinze went to the wall, and the country went into a tailspin.

But the bread-and-butter products of the

Bristol mills . . . Brass sheet, rod and wire . . . pulled the company through as they have before and since. For word had been well-spread that Bristol gave you nothing but good Brass, and that you got it when they said you would. That much is still true. And it's also true that today Bristol makes Brass a lot better, makes far more of it, and has delivery, warehouse and distribution facilities that will give you, wherever you are (short of the Rockies) the alloy you want, when you want it.



One Hundred Years of BRASS made "BRISTOL FASHION"

Like the world-famed merchant ships from Bristol, England . . . Always prompt, shipshape, reliable
The BRISTOL BRASS CORPORATION, makers of Brass in Bristol, Conn. since 1850

McCabe-Powers Auto Body Buys American Coach & Body Co.

Cleveland — McCabe-Powers Auto Body Co., a St. Louis firm, has purchased the American Coach & Body Co., a major producer of automotive equipment for public utilities, in a transaction negotiated by McDonald & Co. here. The sale, which was announced by John J. Powers, and Robert W. Hadley, president of American Coach, is subject to ratification by American Coach shareholders.

Plans for absorption of the Cleveland company by McCabe-Powers have not been completed, but it is known that manufacture of the products of both companies will continue in both plants. McCabe-Powers is planning to acquire additional plant facilities in the East and will continue operation of the American Coach plant at Oakland, Cal. The Public Util-

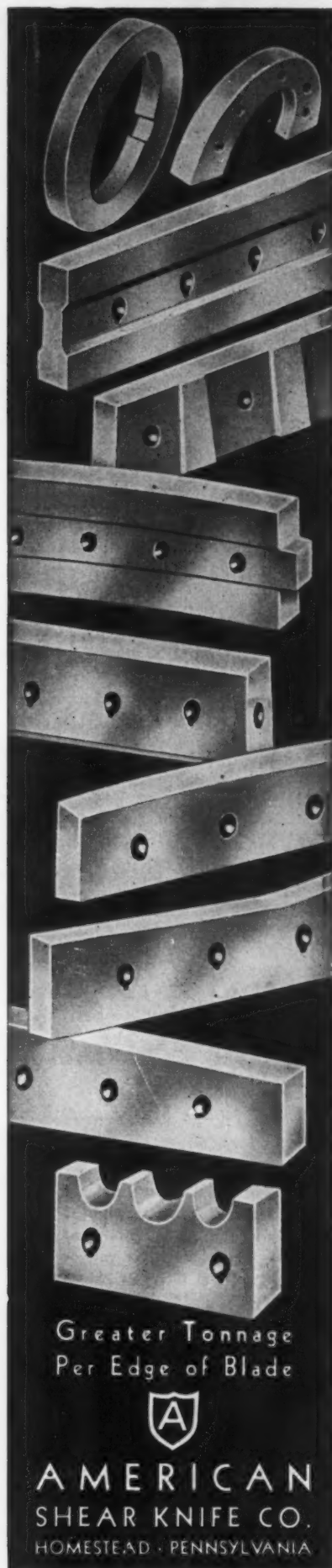
ity Div. of McCabe-Powers and American Coach will be known as the Powers-American Div.

Wage Strike Causes Tie-Up

Michigan City, Ind. — Production was snarled recently at the Pullman Standard Mfg. Co. plant when 1000 workers, members of the AFL Brotherhood of Railway Carmen of America, struck for higher wages, an increase in insurance benefits, and a union shop. A company offer of a 3¢ per hr wage boost instead of insurance benefits was rejected. Negotiations had not been scheduled.

Ewald New CTMA Secretary

Detroit — At the May 11 meeting of the Cutting Tool Mfrs. Assn., Emil Gairing, president, announced the appointment of Martin Ewald to the post of executive-secretary of the organization.



Greater Tonnage
Per Edge of Blade

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SHEAR KNIFE CO.
HOMESTEAD · PENNSYLVANIA

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ARMSTRONG
Lathe Dogs
give extra service because
they are drop forged from
selected open hearth steel,
and are heat treated to extreme
toughness and stiffness.

Hubs are made large enough to permit re-tapping, screws are also of special analysis steel and are hardened at the point to prevent upsetting. ARMSTRONG Dogs come in 10 types with square head or safety headless screws, with straight or bent tails. They are carried in stock by your local ARMSTRONG Distributor.

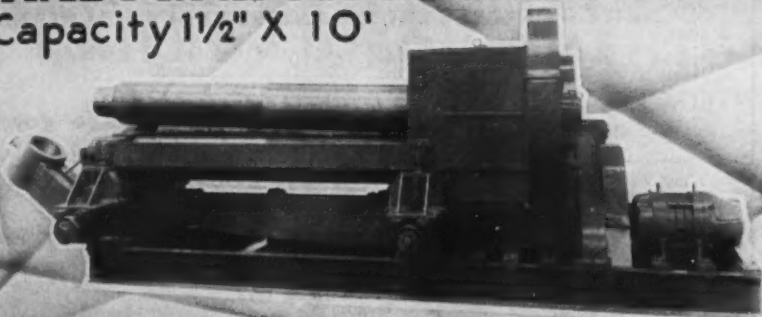
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Light and heavy machinery for all classes of sheet metal, plate and structural work

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VICTOR R. BROWNING & CO., INC. WILLOUGHBY (Cleveland), OHIO

BOILER ENGINEERING AND SUPPLY CO. INC.

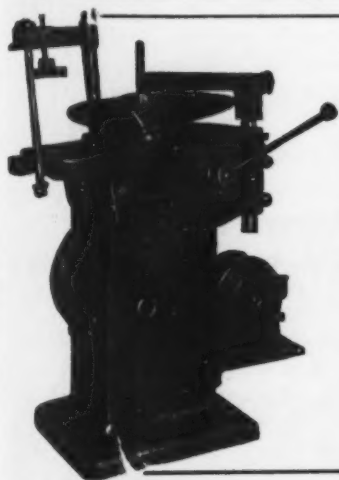
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STACKS AND OTHER PLATE WORK

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"DAVIS" KEYSEATER

Low in Cost. Durable.
Easy to operate.
Table adjustable for
straight or taper keyways.
Three sizes. Keyways
1/16" up to 1".

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STANDARD - BEVEL - SQUARE - SPECIAL
GALVANIZED OR CADMIUM PLATED
ALSO MANHOLE STEPS

NICETOWN PLATE WASHER CO., Inc.

JUNIATA AND CLARISSA STS.

NICETOWN

PHILADELPHIA 40, PA.

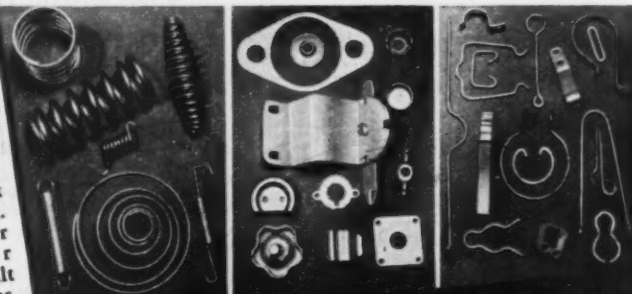
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springs
stampings
wire forms

Parts like these
are made to your
specifications.
When desired,
spot welding, tap-
ping and small
assemblies can be
provided. All
tools and produc-
tion equipment
made in our plant.
Send us your
drawings or
samples. Consult
us on applications.

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M. D. Hubbard Spring Company
305 Central Avenue • Pontiac, Mich.

**RE-NU-BILT
GUARANTEED
ELECTRIC POWER
EQUIPMENT**

D.C. MOTORS

Qu.	HP	Make	Type	Volts	RPM
1	1750	Whse.		600	850/700
1	1500	Whse.		525	600
2	1000	Whse.		450	600
1	650	G. E.	MPC	250	115/145
1	600	Al. Ch.		250	400/300
1	600	G. E.	MPC	600	650
1	600	Whse.		600	750/600
1	500	Whse.		250	300/600
1	335	Whse.	MQ	250	360/220
1	300/300	G. E.	MPC	250	425/850
1	275	Whse.	QM	250	700
1	250	Al. Ch.		250	400/500
1	250	G. E.	MPC	600	250/750
1	150	G. E.		250	300/1050
1	150	Cr. Wh.	CCM	250	1150
1	150	Cr. Wh.	65H	250	900
10	150	Cr. Wh.	83H-TEFC	250	250/450
1	150	G. E.	MPC	250	400/1200
1	100	Rel.	1050T	250	845/730
1	100	G. E.	CD-175	550	600
1	100/150	Whse.	SK-300	250	750/1500
1	125	El. Dy.	30B	250	1200
1	115	Cr. Wh.	JHL	250	225/450
1	50/100	G. E.	MPC	380	475/950
1	100	Whse.	SK-184.5	250	1200
1	90	G. E.	SK	250	1800
1	75	Cr. Wh.	CDM-1242-Z	250	850
1	75	Whse.	SK-180L	115	650
2	75	G. E.	CDM-1126-Y	250	2000
1	75	Cr. Wh.	CMC-85H	250	500/1500
1	60	El. Dy.	25B	250	825/1050
1	60	Whse.	SK	250	500/1000
1	60	Whse.	SK-130	250	1000
1	50	Cr. Wh.	CCM	250	1750
1	50	El. Dy.	50B	500	194/775
1	50	Cr. Wh.	CMC-80H	250	380/750
1	15/50	Cr. Wh.	CMC-81H	250	300/900
1	40	G. E.	CD-1129	250	850/1275
6	25/30	G. E.	CD-105	250	690/2070

MILL & CRANE

2	125	G. E.	CO-1892	250	625
2	80	Whse.	Hoist	250	415
2	50	Whse.	Hoist	250	415
4	50	Whse.	Hoist	250	400
2	30	K. E.	MD-104 1/2 AA	550	700

BELYEA COMPANY, INC.
47 Howell Street, Jersey City 6, N. J.

**Slip Ring
MOTORS**

2—500 H.P. General Electric Type I form M, 3 ph. 60 cy. 2200 volt, 450 R.P.M.
1—400 H.P. Westinghouse, Type CW, 3 ph. 60 cy. 2200 volt, 514 R.P.M.
Each Complete with Primary Oil Switch and Magnetic Secondary Controllers.

**WIRE or PHONE
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NO. 4 UNITED ENGINEERING & FOUNDRY VERTICAL SHEAR 40 x 1 1/2" Capacity. 42" x 36" x 16' INGERSOLL PLANER MILLER, 3 Heads.

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THE CLEARING HOUSE

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

MDNA adopts standard terminology to govern machinery sales . . . Idea contest is attraction of NISA Boston convention . . . MDNA distributes ECA approved purchase list

Standard Terminology Adopted To Govern MDNA Machinery Sales

Detroit—At one of the business meetings of the 1950 MDNA convention, the membership voted in favor of establishing a standard terminology governing the sale of machinery so that the machinery and guarantee conditions of each sale are clearly defined and understood by both buyer and seller.

The establishment of this standard terminology will result in machinery being sold under the following classifications: (1) Rebuilt and guaranteed and subject to a 30-day return option. (2) Checked over and guaranteed and subject to a 30-day return option. (3) As taken from service and subject to a 30-day return option. (4) Taken on as "as-is" basis after inspection and not subject to return.

After the establishment of this standard terminology, a committee was appointed by the board of directors to fully define the rebuilt classification. The committee will make a study and present its recommendation for rebuilding standards. The board of directors will then make the final decision and inform the membership.

NISA Sponsors Idea Contest; Will Give Awards at Convention

St. Louis—In conjunction with its 1950 convention, the National Industrial Service Assn. is sponsoring a contest for good ideas, methods, or gadgets that will benefit firms in the electric motor service industry. Fourteen prizes totaling \$300 will be awarded at the convention to be held at the Boston Statler, June 4 to 7.

The awards include a first prize of \$100, a second prize of \$75, a third prize of \$50, a fourth prize of \$25, and ten honorable mentions of \$5 each. Anyone may enter the contest.

Contest rules specify that all entries must pertain to the electrical repair industry. All entries become association property and will be used by member firms for their benefit. Entries will be submitted to the award committee, care of executive secretary, NISA, 818 Olive St., St. Louis 1, with the name and address of contestant.

Entries may be submitted by photograph, sketch, written description, or working model. Acceptance of entries ends on May 25, 1950. The decision of the award committee will be final.

ECA Approved Purchase List Distributed at MDNA Convention

Detroit—In conjunction with Mr. Knutson's talk on the relationship of ECA and the used machinery dealer, J. M. P. Fox, MDNA executive director, distributed to the group a 17-p. listing of purchase projects in the Marshall Plan nations for which ECA dollars have been approved.

This is the first listing of industrial purchase projects by individual nations to be made available to manufacturers and dealers in the U. S. It was prepared especially for the membership of MDNA by Mr. Knutson. The projects listed cover a broad range of industrial activities and have a market potential for machine tools, metal forming equipment,

Turn to Page 156

THE CLEARING HOUSE

RAILROAD EQUIPMENT—FOR SALE

STANDARD GAUGE LOCOMOTIVES

1—10-Ton, 0-4-0, Gasoline, Whitcomb
1—12-Ton, 0-4-0, Gasoline, Vulcan
1—18-Ton, 0-4-0, Gasoline, Plymouth
1—20-Ton, 0-4-0, Gasoline, Plymouth

1—25-Ton, 0-4-0, Gasoline, Plymouth
2—8-Ton, 0-4-0, Diesel-Mechanical, Whitcomb
1—10-Ton, 0-4-0, Diesel-Mechanical, Plymouth
1—30-Ton, 0-4-0, Diesel-Mechanical, Vulcan

1—35-Ton, 0-4-0, Gasoline-Electric, Porter ...
1—70-Ton, 0-4-4-0, Propane-Electric, Plymouth
1—83-Ton, 2-6-2, Steam, Oil-Fired Saddle Tank

2—100-Ton, 0-4-4-0, 600 HP Diesel-Electric, 4 Traction Motors, ICC Condition

STANDARD GAUGE CARS

5—Gondola, 50-Ton, All-Steel, 40'6", 47"
Sides
6—Flat, 70-Ton, 41'6"
12—Flat, 50-Ton, 41'6"
1—Flat, 50-Ton, 43-Ft., S/U

1—End Dump, 20-Yd., 50-Ton, Western, Auto-
matic Air, DROP DOORS
1—End Dump, 10-Yd., All-Steel, LIFT DOOR
25—Hopper, Twin, All-Steel, 50-Ton
4—Ore Hopper, All-Steel, 50-Ton

1—Box, 40-Ton, 40', Single Sheathed
5—Box, 50-Ton, 50', All-Steel
50—Tank, 10000-Gallon, Class III
50—Tank, 8000-Gallon, Class II

11—Passenger, 64'6", All-Steel, 90,500 Lbs. Lt. Wt., Seating Capacity 72 Persons

SEND US YOUR INQUIRIES AND OFFERINGS

REPAIR PARTS
For
All Types of
Freight Cars

IRON & STEEL PRODUCTS, INC.
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STORAGE TANKS
6,000 Gallon
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2—48"x26' c/c American "Super
Productive" Lathes, tapers, 18
speed, PRT, late.

42"x24' c/c Niles Lathe, taper, 2
carr.

72" Colburn Vert. Boring Mill,
PRT, M.D.

54" Colburn Consolidated Vert.
Mill, PRT, M.D.

36" Rogers Vert. Turret, M.D.,
1942

24" Dill Trav. Head Slotter, M.D.

42"x42"x16' Gray Planer, M.D.

36"x36"x10' Gray Planer, M.D.

6000% Pneumatic 48"x60" hammer

10'x10 ga. Dreis & Krump Power
Brake

Many others in stock

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36-90 Cincinnati Hydromatic DUPLEX Miller
5" Sellers Floor Type Horizontal Boring Mill
#30 "Tri-Way" 3" Universal Horizontal
Boring Mill
#33 Lucas 4 1/2" Horizontal Boring Mill
16" x 54" Monarch 16-speed Engine Lathe
16" Gould & Eberhardt Tool Room Shaper

**HAZARD BROWNELL
MACHINE TOOLS, INC.**

350 Waterman St., Providence 6, R. I.

NEW — Suppliers of Equipment — REBUILT

Rolling Mills and other Steel Plant Equipment carrying new
equipment guarantee and available within 90 days of order.

1—38" 2-Hi Reversing Blooming Mill, complete with
motor, tables, manipulator, shears and auxiliary
electric equipment.

1—30" 2-Hi Reversing Mill, with motor and drive,
tables, manipulator optional.

1—28" 2-Hi Reversing Blooming Mill, with tables,
manipulators and motor.

1—5 Stand 2-Hi, 30"/32" x 44"/60", hot sheet
mills, 2 stands equipped with Wean catcher
tables, automatic doublers, driven through Falk
S 15, gear reduction, by 1500 H.P. 3 phase, 60
cycle, 2300 Volt motor.

1—Continuous pair furnace, 2 continuous pack fur-
naces, oil gas fired.

1—1-Stand, 3-Hi 18" Bar Mill with tilting tables,
shears, furnace, etc., and all motors and electric
equipment.

1—3-Stand Tandem Cold Mill, 12" x 22" 2-Hi Mills
with recoller and motors.

10 1/2" dia. x 14" Face 2-Hi Standard Mill, Roller
Bearing equipped, complete with drive and motor.

1—10" x 12" 2-Hi Bilss Cold Mill with recoller.

1—6" x 6" 2-Hi McWilliams Cold Mill with edging
rolls and recoller.

1—3-Stand Tandem, 4-Hi Cold Mill, 4 1/2" x 16" x
12", roller bearing equipped, with motors and
recoller.

LLEWELYN ASSOCIATES, Inc.

Cable Address:
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440-441-442 Oliver Building

Pittsburgh 22, Penna., U. S. A.

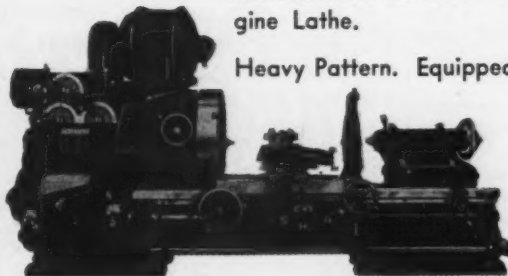
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NEARLY NEW MACHINE

**AMERICAN 36"x360" Centers Geared Head En-
gine Lathe.**

Heavy Pattern. Equipped with 2 carriages.

Arranged for motor
drive with motor



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AMERICA'S LARGEST STOCK . . .

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MACHINERY CO., INC.

BROOME & LAFAYETTE STS., NEW YORK 13, N. Y.

TEL.: CANAL 6-5360 * CABLE ADD.: WOODWORK, N. Y.

THE CLEARING HOUSE

Continued from Page 152

AIR COMPRESSOR

1000 Cu. Ft. Worthington "Feather Valve," 18" x 11" x 14" two stage with 185 HP synchronous motor on shaft.

AUTOMATIC

4 3/8" Conomatic 4 spindle, serial No. 2191K with, reel, chip conveyor, extra equipment.

BORING MILLS

4 1/2 bar Lucas No. 33. Table 46" x 64" Max. height 36", Max. to outboard support 11'.

100" Niles Bement Pond. Extra heavy type. 2 swivel heads, power rapid traverse, 35 HP direct current motor.

BROACH

15 ton 36" stroke American vertical duplex surface with tilting type workholder.

DRILL

42 spindle, No. B16 Natco multiple with 18" x 48" drilling area and two box tables.

GEAR HOBBER

Type T Barber Colman. Designed for either straight or taper splines, helical or spur gears. Also type A and Nos. 3 & 12 Barber Colmans.

GRINDERS

6" x 18", No. 10 Brown & Sharpe "Electric Hydraulic" Three with and two without spindle oscillation. New 1940 and 1941.

10" x 36" Norton type C hydraulic with hydraulic quick in-feed. Serial No. C16458, new in 1942.

10" x 72" Norton type C hydraulic made at factory to swing 14". Serial No. 21750, new in 1944.

23" x 36" Norton type C with mechanical table traverse, hydraulic quick in-feed. Serial No. C18281, new 1943.

LATHE TURRET

No. 2FU Foster Fastermatic Serial No. 2FUS29, new in 1944. Quite a little tooling.

MILLERS

Cincinnati Hydromatic Sizes: 3-24, 34-36, 4-36, 4-48, 5-48, 56-72 and 56-90.

PRESSES

1000 ton, No. 666 Toledo knuckle joint Coining. 2 1/2" stroke, 18" shut height, bed 37" F to B x 31" R to L.

350 ton Clearing Crankless, model F1350-42, serial No. 45-11155P, new 1945. 20" stroke, 28" shut height, 36" x 42" bed.

600 ton Hamilton No. 2316 1/2 eccentric shaft forging. Stroke 4"; shut height 16" bed 28" F to B x 23 3/4" R to L.

No. 506 Bliss on inclined legs with double roll feed and scrap cutter. About 126 tons. 3" stroke, 11 1/2" shut height.

1000 ton Baldwin Southwark "Hy-Speed" hydraulic. 20" stroke, 56" daylight, bed 42" F to B x 54" R to L.

UPSETTERS

2" National. Serial No. 13213. Has suspended slides with long overarm guide. Has 15 HP motor.

4" Ajax. Serial No. 3156. Has twin drive gears, suspended slides, self contained backshaft, 30 HP motor.

MILES MACHINERY CO.
SAGINAW, MICH.

motors, generators, turbines, and many other industrial items.

Data covering the projects listed includes the date each was approved and the project cost in millions of dollars. The date denotes dollar approval and does not necessarily mean that purchasing for the project has been completed or begun.

Mr. Knutson also made available the motion picture "ECA Means Business," which was shown at a later time because of the full schedule.

Pricing Service is NISA Talk

Chicago—The Central District chapter of the National Industrial Service Assn. recently held a local meeting at the Electric Club of Chicago. Paul M. Sievert of Sievert Electric Co., presiding officer, introduced guest speaker A. E. Vaughn of Vaughn's Pricing Service. Mr. Vaughn spoke on the topic of the functions of a pricing service modeled after the Henderson-Hazel service used by the electrical contracting industry. After the talk, the members participated in a question-answer period.

Lock Nut Plants Up for Resale

Chicago—The Acme Equipment Co. and the Strom-Johnson Machinery Co. have recently purchased all the machinery and equipment of the Lock Nut Corp. of America for resale. It consists of three nut and bolt fabricating plants. Each plant contains machines able to produce approximately 250,000 bolts and 160,000 nuts per eight hour day.

Detroit Small Tool Demand Drops

Detroit—While most machine tools are moving at a fair pace in this city, Magnaflux units, arc welders, air tools, riveters, and other small tools are reported to be in very slow demand. This is not alarming, say dealers handling these items, since these units usually run counter market. These dealers reported that business was fine up until the past two months.

Resume Your Reading on Page 153

5" National High Duty Upsetting & Forg. Mach. Air friction clutch; side shear; auto. lubricating system; jib crane; 60 H.P. motor; V-belt drive

3" Ajax Single Stroke Solid Die Ball Header, rated capacity 4 1/2" balls, suspended slides, air clutch

Upsetting & Forg. Machs., National High Duty, guided overarm heading slide, suspended slides, 1 1/2", 2", 3", 4", 5"

Ajax & Acme Upsetting & Forg. Machs., not suspended slides, 3/4", 1", 1 1/2", 2 1/2", 3"

W. W. Bulldozers, #1, #2, #3, #4, #5, #4 High Speed

Drop Hammers, 800# to 2500#

Hazel Air Forg. Hammer, #6B, Cap. 7" sq.

Bradley Hammers, Cushioned Helve, Upright & Compact, up to 500#

Trimming Press, #59 1/4 Toledo, 385 ton; other trimmers 55 to 200-ton

L. & A. Plate Shear, Cap. 1" x 12'

Bar Shears, Open & Guillotine, 3/8" to 7" Rd.

Ferracute #6 Solid Back Geared Press, 100-ton

Minster 88-ton S.S. Press, 16" stroke

Solid Back Presses, 20 to 100-ton

#94-A Toledo S.S. Double Crank, Tie Rod Press; bolster 40x36"

Bliss Knuckle Joint Press, 250-ton

Cleveland EF Sgl. End Punch, 48" throat, 1 1/4" thru 1"

Single & Double End Punches, various throat depths and caps.

L. & A. Multiple Punch, 8', 150-ton

L. & A. Multiple Punch, 10', 350-ton

Ryerson Serpentine Throatless Shear, 1/2"

#416-C Niagara Circle & Slitting Shear, 1/4"

Flanging Machine, McCabe, cap. 3/4"

Bertsch Straightening Roll, 1"x68"

Ryerson Friction Saws, #0, #1 & #3

Landis Landmaco 1", 2-sp. Threader, lead screws, single with Lanco Hds. up to 4"

BOLT, NUT AND RIVET MACHINERY. COLD HEADERS, COLD BOLT TRIMMERS, THREAD ROLLERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES, POINTERS, THREADERS, WOOD SCREW EQUIPMENT.

Diamond Face Grinder, Segment Wheel 36",

Table 84"x24", Hydraulic operated

Landis Motor Driven Pipe Threader, 8"

American Wheelabrator, 36x42"

DONAHUE STEEL PRODUCTS CO.

1913 W. 74th Street, Chicago 36, Ill.

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